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INDEX TO VOLUME XXXIII

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Scope of This Index

This Index is divided into three sections—Subjects, Places, and Authors. Under each heading in the three sections the order of listing is by sequence of publication.

In the notices of publications (pp. 97, 205, 317, 441, 571, 691) readers are directed to other sources of information on the various subjects dealt with in THE AMERICAN CITY. Other valuable information is contained in THE MUNICIPAL INDEX, editions of 1925 and 1926.

As an aid to readers in looking up references, the page numbers of the individual issues of the present volume of THE AMERICAN CITY are given below:

July, 1-123 | September, 223-347 | November, 461-583
August, 125-221 | October, 349-459 | December, 585-705

Index to Subjects

Accident Prevention
- Graduate Fellowships in Safety Education.... 146
- Regulations for Safety of Railroad Crossings.. 311
- Safety Contest for Schools..... 473
- Safety Education in Louisville, Ky..... 480
- Safety Fencing Prevents Bad Accident..... 579
- Vote for Grade-Crossing Elimination in New York State 589
- Teaching Safety to School Children..... 640
- Protecting School Crossings and Re-zoning for Safety, Minneapolis, Minn. 656

See also "Fire," "Traffic"

Accounting, Municipal—See "Finance"

Aerial Photography
- Keosauqua Way, Des Moines, Iowa....October cover
- Paris, France .....November cover, 486
- Toledo, Ohio .....December cover

Annexation
- Annexation Voted in Grand Rapids, Mich..... 185
- Legislature's Power to Annex Territory to City 563

Aviation
- Grading Operations on Cleveland's New Field 341
- Airplane Patrol for Forest Fires, Minnesota.. 658

Baths and Swimming Pools
- Municipal Pool, Montgomery, Ala....August cover
- City's Power to Furnish Water for Church Pool 311
- Municipal Pool Without Taxation, Sioux City, Iowa 424
- Bathing-Beach Water Made Safe..... 495

Beautification, City
- Birds and Flowers in a Modern Subdivision, Springfield, Ohio 539

Bill-Boards and Signs—See "Signs" and "Traffic"

Bond Issues—See "Finance"

Bridges and Culverts
- Care of Bridge Floors, Fayette Co., Ind..... 24
- The City Bridges of London..... 247
- A Remarkable Lead Paint..... 451
- Culverts for Mariemont, Ohio..... 453
- Concrete Bridge, near Harrisburg, Pa..... 610

Building Codes
- Chimneys and Flues in Building Codes..... 81
- Negligent Enforcement of Code..... 87
- Fire Loss Due to No Building Code, Santa Barbara 371
- Building Codes Require Ant-proof Structures... 569

Buildings, Public
- Police and Fire Stations, Lakeland, Fla..... 17
- Memorial Building and City Hall, Chanute, Kans. 67
- Municipal Building and Community Center, Highland Park, Texas.....July cover, 75
- New Municipal Group, Charlotte, N. C..... 186
- Baltimore's War Memorial 189
- Improvements on Grounds Around New Public Buildings, Portland, Me..... 223
- New Municipal Building, Bluefield, W. Va.... 259
- Reconstruction of Nashville's Parthenon..... 260
- Art Gallery for Town of 1600, Lyme, Conn.. 281
- Community Hotel, Camden, N. J..... 459
- Prize-Winning Design for Municipal Building 622
- Combined Memorial Hall, Municipal Building and Fire Headquarters, Audubon, Iowa..... 659
- New City Hall, Amsterdam..... 665

See also "Schools"

Cartoons
- The Town Forest and the Taxpayer..... 43
- Murderers' Row 229

The Need for Uniform Motor Traffic Laws..... 367
Plight of New Jersey Home-Owner..... 687

Celebrations
San Francisco's Diamond Jubilee Illumination. 385
Hallowe'en, Spokane, Wash..... 419
Poinsettia Festival, Ventura, Calif..... 425
The Municipality at Christmas Time..... 661

Cemeteries
Abandoned Cemetery Becomes Park, Bradford, Pa. 66

Chamber of Commerce Activities in Public Affairs —See "Civic and Commercial Organizations"

Charities and Relief
Growth of Community Chest Movement..... 75
$70,000,000 Annually for Charities in New York City 81
In Times of Disaster, Let Boy Scouts Help!... 81
Community Trust Idea Spreading..... 149
Homes for Destitute Normal Children..... 187
Model of Cottage Institution for Children... 380
The Mayors and Golden Rule Day..... 513

Charters—See "Government"

Child Welfare—See "Charities," "Health," "Schools"

City Manager Plan—See "Government"

City Planning, Replanning and Zoning
City Planning Solves Traffic Problem... 3
Relation of Water-Supply to Zoning..... 7
To Prevent Hardening of Street Arteries.... 11
Village Planning and Replanning..... 29
La Cité Jardin de Kapelleveld..... 39
Guiding Growth of Washington..... 40
The Esthetic as a Factor in Life..... 128
Selling City Planning to Dallas..... 140
Recent Theories in Street and Block Planning.. 143
Extravagance and Waste in the Unplanned City 172
Beauty as a Factor in City Development.... 177
Fundamentals of American Zoning..... 178
A Judicial Appreciation of Town Planning.... 185
The Federal City Planning Commission..... 188
Applying Rule of Reason to Zoning Ordinance. 248
Airplane View of Keosauqua Way, Des Moines, Iowa .....October cover
Comprehensive City Planning, Des Moines, Iowa 349
A Contrast in Villages..... 365
Street Intersections and Traffic Relief..... 411
Two Conceptions of City Growth..... 520
Games, Birds and Flowers in a Modern Subdivision, Springfield, Ohio..... 539
Street-Widening and Building-Line Procedure in England 596
Street Sections Suggested for Wakefield, Mass. 619
Through Streets and Re-zoning in Minneapolis.. 656
Town Plan, Palos Verdes, Calif..... 666
Not City Planning, but the Lack of It, Is Costly. 679
Plight of New Jersey Home-Owner 687
See also "International Union of Cities," "Regional Planning," "Zoning Notes"

City's Legal Rights and Duties, The—See "Legal Decisions"

Civic and Commercial Organizations and Their Work 65, 191, 287, 424, 547, 671
Junior Chambers of Commerce in the Schools 6
Protection Against Fake Stock Promoters, Gloversville, N. Y..... 67
Helping Negro Farmers, Houston, Texas..... 67
National School for Commercial Executives.... 68
To Indicate—Not to Dictate..... 193
How Chambers of Commerce Can Help to Solve the Negro Problem..... 194
New Hotel, Richmond, Calif..... 215
Flowers for City Beautification, Redondo Beach, Calif. 288
Cooperation of Philadelphia Organizations..... 288
New Things a Board of Trade Could Do..... 427
Village Civic Club, North Warren, Pa..... 519
New Chamber of Commerce Headquarters, Joliet, Ill. 547
Finding and Developing Leaders..... 551
Wrapping Christmas Packages to Help Post Office, Flint, Mich. 662
The Health Appeal in Community Advertising.. 671
New Chamber of Commerce Home a Community Asset, Toledo, Ohio..... 675
For other activities of civic and commercial organizations, see "Baths," "Buildings," "Celebrations," "Finance," "Fire," "Health," "Highways," "Markets," "Music," "Parks," "Schools," "Traffic"

Civic Service
"Know Birmingham" 18
"Tiny Town," Springfield, Mo..... 65
"America First" Cards, New Orleans, La.... 68
Declaration of Independence, Boston Common. 79

Cleaning, City—See "Street Cleaning"

Comfort Stations
Bradford, Pa. 66
Public Comfort Stations..... 613

Community Advertising
In Florida 296
American Community Advertising Association.. 297
Health Appeal in Community Advertising 671

Community Buildings—See "Buildings"
Community Centers 537

Community Chests—See "Charities"

Conferences, Conventions and Exhibitions..... 101, 209, 323, 447, 575, 697
See also "International Union of Cities"

Courts
Municipal Power to Create Courts and Appoint Judges 311

Crime and Prisons—See "Police"

Dust Prevention—See "Street Cleaning"

Elections
P. R. Upheld in Cleveland..... 305

Engineering, Municipal—See "City Planning," "Highways," "Lighting," "Power-Plants," "Public Works," "Water-Supply"

Finance, Municipal and County
New Statistics of Cities..... 2
Taxation of Municipal Securities Abandoned.. 6
Ten-Year Program for Detroit..... 83
Taxes to Support City College Constitutional.... 87
Taxes to Pay Hydrant Rentals..... 89
Exempting Machinery from Taxation..... 137
Taxation and Economy Defined..... 201
Budget Procedure for Utah Municipalities.... 260
Assessment for Public Improvements..... 309
Partial Tax-Exemption of Buildings..... 305
Budget and Accounting Procedure, Pittsburgh.. 360
Time Limits for Municipal Bonds, Michigan... 380
Big Bond Issues, Toledo and Kansas City..... 386
100 Per Cent Valuation Recommended..... 386
A Forward Step Needed by Cities..... 418
The Mayor and the Budget in New York City.. 423
Equalization of Taxes, Norwich, Conn..... 425
Per Capita Costs Increase..... 473
See also "Municipal Bond Market," "Parks," "Schools"

Fire Prevention and Control
Fire Protection, Medina, N. Y..... 16
Chambers of Commerce Help Fight Arson..... 69
For Maximum Efficiency of Fire-Alarm Systems 77
Keeping Down Fire Losses, Dayton, Ohio.... 83
New Pumper for Hot Springs, Va..... 105
Jig for Welding Fire-Hydrants..... 117
Ordinance to Clear the Way for Fire Apparatus. 142
Fire Hazards in Public Buildings..... 147
New Motorized Booster Pump..... 221
Campaign Material for Fire Prevention Week.. 270
Fire Equipment Standardization..... 272
Cooperation Between Fire and Water Departments 283
New Chemical Engine, Decatur, Ga..... 341
Loss Due to No Building Code, Santa Barbara.. 371
Making the Most of the Fire Chief's Job..... 374
Fire Fighters North and South Use Motor Equipment 405
Fire Prevention Work, Huntington, W. Va..... 424
Scope of City's Power to Prevent Fires..... 433
Fire-Boat, Seattle, Wash. 451
Tight Chimneys Lessen Fire Loss 468
Fire Protection for the Small Town, Shawnee, Okla. 496
New Motor Fire Equipment, Springfield, Ohio, and Petaluma, Calif..... 517
Home-made vs. Standard Apparatus..... 526
Home-made Apparatus, Roslyn, Pa..... 527
Statue to Volunteer Firemen, Elizabeth, N. J... 528
Fire Stations, Mamaroneck, N. Y..... 612
Airplane Patrol for Forest Fire Protection in Minnesota 658
Progress Toward Reducing Fire Insurance Rates, Beaufort, S. C..... 660
Portable Fire-Pumps in Small Towns..... 701

Flood Prevention
The Pueblo Conservancy Project..... 381

Forestry
Municipal Forests Profitable..... 42
The Town Forest and the Taxpayer..... 43
Effect of Trees on Temperature..... 83

Our Street Trees: They Deserve Better of Us 521
Forward Steps in Municipal Affairs 16, 185, 259, 419, 527, 657
Garbage Collection and Disposal—See "Waste Collection"
Government, Municipal and County
The Greatest Need of Local Government 125
Is Chicago to Be Our First City-State? 127
How the City Manager Plan is Working 293, 406, 557
Why Pasadena's City Manager Resigned 303
Thin-skinned Politicians and Hard-headed Reformers 585
The Reformer, the Boss and the Leader 592
Rochester Adopts City Manager Plan; Boulder Retains It 605
City Hall Switchboard a Time-Saver, West Palm Beach, Fla. 657
A Help-Your-City Suggestion Box, New York City 663
The City and the Educated Citizen 677
See also "Elections"
Grade Crossings—See "Accident Prevention"
Harbor Development—See "Water-Front Development"
Health and Sanitation
Health Questions for Your Town 68
Chamber of Commerce Leadership in Health Work 69
Municipal Power to Safeguard Public Health .. 85
Infant Mortality Rates Lowest in 1924 142
A Public Menace and a Suggested Cure 169
Hints for Public Health Officers 171
The Conquest of Typhoid Fever 291
A New Endeavor in the Tuberculosis Field ... 297
Child Hygiene Legislation of 1925 377
Typhoid Due to Cross-Connections, Winona Lake, Ind. 395
New Health Legislation 431
Sanitary Conditions in Wayside Eating Places, New York State 437
Health Survey of 86 Cities 461
Control of Drug Addiction 509
Conserving Sight of School Children 538
The City's Relation to Hospitals 561
New Jersey Municipalities Unite in Milk Control 652
Ordinance for Sanitation in Public Eating Places, Summit, N. J. 657
A Community Budget for Tuberculosis Control 664
Typhoid Prevented by Milk Pasteurization, Dayton, Ohio 669
The Health Appeal in Community Advertising .. 671
See also "Water-Supply"
Heating, Central
Possibilities of Central and District Heating, Canada 44
Highways (Roads, Pavements, Streets)
Securing Paving Through Petition, Wellsburg, W. Va. 19
Stone Roads of Monroe Co., Ind 25
Bituminous Pavement for Heavy Traffic 33
Tractor vs. Ox in Cuban Road Building 105
Portable Asphalt Plant for Patching 107
Road-Roller with Scarifier 119
Asphalt Mastic Filler for Granite Blocks 121
Bituminous Surface Treatment of Gravel Roads, Menominee Co., Mich. 133
Surface Treatment of Brick Pavements 148
Design and Maintenance of Bituminous Macadam Pavements 157
Abstract of Street Improvement Specifications, Akron, Ohio 161
A Road-Paving Race, Greenville, S. C. 192
Investigation of Earth Roads 197
Road Roller Carries Repair Materials, West Pittston, Pa. 219
Sheet Asphalt Paving on Lincoln Highway in New Jersey 273
Legal Aspects of Trunk-Line Roads Through Cities and Villages 298
A New Steel Road-Drag 327
French Study Brick Roads in America 327
Hand Spraying Device for Maintenance Work. 331
One-Man Grader with Power Lift 331
Portable Crane for Light Trucks 335
Asphaltic Concrete Road Construction, Mich.. 384
Plans for 1926 Road Show 396
Investigations of Smoothness of Pavements 397
Comparison of Typical Concrete Road Sections 414
Requirements for Paving Guarantees 481
Paving for Residence Streets 480, 637
Bituminous Street Repair Methods in Baltimore 604
Hints, Helps and Happenings 75, 296
Housing
Prize Essays on Housing Intellectual Workers 46
Home-Building by Limited Dividend and Industrial Corporations, Pa. 132
To Outlaw "Jerry" Building 282
Housing Essay Prizes 516
"Better Homes" Prize Winners 541
Industrial Housing, Manchester, N. H. 632
Industrial Development
Exempting Machinery from Taxation 137
International Union of Cities 95, 203
American and Canadian Committees to Aid the Union 190
America Participates in the Congress 486
Law, Municipal—See "Legal Decisions," "Ordinances"
Legal Decisions 87, 199, 309, 435, 563, 681
City's Power to Regulate Occupations 198
Rights of Paraders in Streets 435
Abutter's Title to Land Occupied by Street .. 683
See also "Fire," "Health," "Highways," "Liability," "Zoning Notes"
Letters to the Editor 40, 137, 188, 197
Liability, Legal
Negligent Enforcement of Building Code 87
Negligent Operation of Steam Roller 89
Councilmen's Liability for Restitution of Municipal Funds 199
Responsibility Concerning Sewers 199
Newspaper Reports of Municipal Proceedings .. 309
Liability for Failure to Light Streets, Washington, D. C. 535
Street Railroad's Liability for Paving Cost 563
Liabilities Concerning Ice and Snow 681
Personal Injuries Caused by Fire-fighting Appliance 683
Responsibility Concerning Surface Waters 683
Liability of Municipal Officers for Wrongful Acts 683
Libraries, Public
Hospital Service 488
Expenditures and Circulations 608
Lighting, City and Street
Chicago's Residential Street-Lighting Program 26
Unique Street Lighting, Grosse Park, Mich 121
Study Future Street-Lighting Requirements 166
Hollowspun Concrete Lighting Standards 211
Street Lighting in San Francisco 247
Electric Lighting Rates, New York State 271
Cleveland Street Lighting 297
Lighting City Entrance Signs 345
Municipal Lighting Plant, Jamestown, N. Y... 368
Gas Lighting Rates, New York State 429
A Residential Street-Lighting Problem 465, 625
Improved Illumination in Pasadena 488
Liability for Failure to Light Streets, Washington, D. C. 535
Boulevard Lighting System, Kalamazoo, Mich. 597
Manufacturers' and Contractors' Items—See "News and Illustrations"
Markets, Municipal
A Critical Study 149
Farmers' Market, Burlington, N. J. 549
Memorials
Memorial Building and City Hall, Chanute, Kans. 67
Baltimore's War Memorial 189
Statue to Volunteer Firemen, Elizabeth, N. J... 528
Memorial Hall and Municipal Building, Audubon, Iowa 659
Methods, Materials and Appliances—See "News and Illustrations"
Milk, Inspection and Regulation of—See "Health"
Motion Pictures—See "Recreation"
Motor Apparatus
Cleaning, City 61
Ditching 583
Fire 16, 61, 105, 221, 341, 405, 449, 497, 517, 527, 598, 699, 701
Hauling 9, 113, 138, 335
Hoist 609, 705
Motor Mowers 111, 113, 339, 345
Road Machinery 105, 107, 119, 136, 219, 250, 273, 331, 341, 581
Snow Removal 231 245, 250

331, 337, 343, 347, 389, 409, 445, 505, 581
Street Cleaning 701
Street Sprinkling 236
A New Type of Jack 699

Municipal Bond Market, The 89, 201, 307, 437, 567, 689

Municipal Index, 1926 396

Municipal Officials
City and Town Clerks of Rhode Island Organize 652
See also "Salaries"

Municipal Ownership
Municipal Railway Operation in Detroit 28
Markets Critically Studied 149
Uses to Which Municipal Property May Be Devoted 199
Dangers in Municipal Ownership to Be Avoided 275
Engaging in Plumbing Business 309
Successful Operation of Public Utilities, Jamestown, N. Y. 368
Municipal Coal and Gasoline Stations, Lincoln, Nebr. 459

Music, Municipal
Band-Stand, Bradford, Pa. 66
Where They Sing and Play Together, Ashland, Wis. 289
Summer Civic Opera, Salt Lake City, Utah .. 528

News and Illustrations .. 103, 211, 325, 449, 577, 699

Ordinances
Clearing Way for Fire Apparatus 142
Requiring Sewer Connection 311
Sanitation of Public Eating Places, Summit, N. J. 657

Parks
Abandoned Cemetery Turned Into Park, Bradford, Pa. 66
A Mowing Unit 111
An Effective Power Mower 113
Mother's Kitchen in a City Park, Omaha, Nebr. 139
An Endowment for Kewanee, Ill. 191
Donations of Park Lands, Greensboro, N. C. .. 287
Rolling Fairways While Cutting 339
A New Electric Lawn-Mower 345
Bonds Voted to Complete Park, Florence, S. C. 528
Harrisburg's Park and River-Front Development 586

Pavements—See "Highways"

Police
Police and Fire Protection, Medina, N. Y. 16
Fighting Crime with Tear Gas, Pittsburgh .. 60
Restrict Manufacture and Sale of Firearms .. 75
The Policeman 137
Working Partnership of Police and Public in Traffic Regulation 228
Advertising Cards Warn Criminals and Aid Police, New York City 280
Control of Drug Addiction 509
Cooperation in Tracing Criminals 567
Federal Officers Cannot Replace Village Policemen 589
Abominable Conditions in County Jails 606
Award for Program to Reduce Crime in New York City 611

Populations
Estimated for 72 Cities 296

Power-Plants, Municipal, and Their Equipment
Hydro and Steam Power-Plant, Colorado Springs 173
New Boiler Plant, Kansas City, Kans. 341
Municipal Power-Plant, Jamestown, N. Y. 368
Portable Pump Eliminates One Power-Plant .. 449

Publications
Book and Pamphlet Notices 97, 205, 317, 441, 571, 691
Manufacturers' Literature on Methods, Materials and Appliances ..... adv. pp. 4 and 6 in each issue
Making the Annual Report Effective 590
Municipal Index, 1926 396
Municipal Reports 101, 209, 447, 575, 697

Public Opinion
Thin-skinned Politicians and Hard-headed Reformers 585

Public Works
"A Rippling Rhyme," by Walt Mason 19
Models of Proposed Improvements, Portland, Ore. 62
A Remarkable Lead Paint 451
Township Government Made Efficient, North Warren, Pa. 519
New Aluminum Paint for City Use 577
A Tractor That Is Not Too Bulky 581
Tractor and Shoveler Save $100 a Day, Bellingham, Wash. 583
See also "Bridges," "Finance," "Highways," "Lighting," "Parks," 'Power-Plants," "Water-Supply"

Real Estate—See "City Planning"

Recreation
Program Building for Playgrounds, Chicago, Ill. 4
Recreation Cabins for Boys and Girls, Hutchinson, Kans. 17
Motion Picture Study Clubs 79
Vacations for New Yorkers 79
Better Recreation for Scranton 170
Public Recreation in Rhode Island 197
Sale of Sport Equipment in Parks 309
No City Can Evade This Responsibility 364
Awards Offered for Improvement of Playgrounds 366
Town and College Join Forces for Recreation, Eugene, Ore. 484
Municipal Theaters Increasing 495
Free Educational Motion Pictures, Boston 500
The Sydney Zoo 518
Games in a Modern Subdivision, Springfield, Ohio 539
"Safety Playgrounds" 542
Municipal Pageantry as a Means of Civic Education 653
Playgrounds from Bond Issues, Gifts and Bequests, Fresno, Calif. 657
The Swing-Bob for Playgrounds 703
A Safe Merry-Go-Round for the Little Ones .. 705
See also "Baths and Swimming Pools," "Music"

Regional Planning
Government of Planned Region 20
A Regional Plan for the San Francisco Bay Counties 22
Wherefore Country Planning? 514

Reports, Municipal—See "Publications"

Roads—See "Highways"

Salaries
Salaries of Technical Engineers 297
Salaries, Cities of 40,000 to 100,000 419

Schools, Public
Junior Chambers of Commerce in the Schools 6
"Tiny Town," Constructed by School Children, Springfield, Mo. 65
School Bonds Voted 34 to 1, Bluefield, W. Va. .. 66
Wastes in School Ventilation 77
Essay Contest on City's Future, Lakewood, O. 288
Progress of Schools in a Utah County 421
Shortening School Hours for Religious Instruction 435
Better Lighting for School Buildings 485
Value of Visiting Teacher's Work 551
Danger of High School Competitive Athletics .. 642
See also "Accident Prevention," 'Health"

Sewers and Sewage Disposal
A Trouble Truck for the City Sewer Division, Baltimore, Md. 9
Backfilling a Sewer Trench, Rochester, N. Y. .. 107
Gasoline Locomotive Serves Providence Sewage Works 138
Sewage Pumping-Station, Hammond, Ind. 167
Sewage Settling and Septic Tanks Alone Do Not Produce Safe Effluents 176
Some Disposal Problems Discussed 266
Ordinance Requiring Sewer Connection 311
Sewage Treatment Works, Syracuse, N. Y. .. 356, 501
Pressure-tight Sewer Joints 457
Model of Sewage Disposal Plant, Milwaukee .. 507
Pumps for Activated Sludge 579
Handling Material for Canton's Sprinkling-Filter Reconstruction 609

Signs, Street
Double-faced Aluminum Street Signs 215
Street Signs for White-Way Poles 219
Permanent Street Signs 453
Naming and Marking of Streets 620
Psychological Factors in Highway Safety 645

Snow Removal
Rome, N. Y., Believes in Snow Removal 231
In West Virginia with Pusher-Type Plows 245
A Snow-Plow on a Two-Way Drive Truck 331
Fighting Snow with a Tractor in Canada 337
Clearing Heavy Snows in Warren Co., N. J. 343
Heavy-Duty Snow-Plow Tractor-Truck 347

Snow Removal from City Streets.....389, 503
Report on Snow Removal, Iowa..... 399
In Massachusetts 409
A Snow-Motor 455
A Heavy-Duty Tractor Plow..... 579
Winter Road Maintenance in Northern New York 641

Social Welfare
Action Against Salacious Plays and Magazines 553

Street Cleaning and Sprinkling
Economical Sprinkler Outfit for a Small Community, Spooner, Wis..... 236
Reducing Street-Cleaning Expense by Motor Sweepers 701
See also "Snow Removal"

Street Lighting—See "Lighting"

Streets—See "Highways"

Swimming Pools—See "Baths"

Taxation—See "Finance"

Traffic Control and Facilitation
President Coolidge on Congestion..... 1
City Planning Solves Traffic Problem..... 3
Traffic Regulation and Direction Signs..... 14
Basic Factors in Traffic Problems..... 38
Commissions to Traffic Officers Abolished, Bluefield, W. Va..... 66
Down-Town Traffic and Parking, Cleveland, Ohio 73
Jail Sentences for Drunken Drivers..... 75
Safety Engineers on Traffic Accident Prevention 75
Flashing Traffic Beacon..... 109
Zone Marker 119
Making the Nation's Capital Safe..... 129
Advantage of Traffic Signal Lights..... 149
Proposed Bridge Over Potsdamer Platz, Berlin. 181
Gift of Traffic Control Devices, Joliet, Ill..... 185
Signal Lights Handle Traffic Effectively, Butler, Pa. 187
Timer for Traffic Signal Control..... 217
Working Partnership of Police and Public in Traffic Regulation 228
Murderers' Row 229
Through-Traffic Highways in Pennsylvania.... 230
Code of Colors and Forms for Traffic Signals.. 241
Police Cards Warn Jaywalkers and Motorists.. 244
Flashing Beacons at Trolley Safety Isles, Baltimore 260
Pavement Markings Point Way Toward Traffic Problem Solution 290
Gasoline Pumps on Highways..... 311
Pavement Markings 333
A Dual Control Switch for Traffic Lights..... 343
No City Can Evade This Responsibility..... 364
The Need for Uniform Motor Traffic Laws.... 367
Traffic-Control Methods of German Cities..... 377
Street Intersections and Traffic Relief..... 411
Standard Signs for Federal Highways..... 412
Painted Curbs Indicate Traffic Rules, Portland, Me 420
Kansas City to Have a Trafficways Commission 431
Combination Hand and Motor Controls for Traffic Signals 457
Spotlight for Traffic Officers..... 459
Expediting Traffic at Intersections..... 474
The Traffic Officer's Hand Signals..... 498
A Traffic Game for Children..... 500
Minnesota Arterial Highway Law..... 527
Visualizing Toll of Automobile Fatalities..... 536
Directional Signs and Traffic Junctions..... 543
Chronic Reckless Drivers..... 545
"No Traffic Law Violation Week," Shreveport, La. 547
Relative Rights of Pedestrians and Vehicles.. 563
Contact Flasher for Electric Warning Signals.. 577
An Effective Road Barricade..... 583
Psychological Factors in Highway Safety..... 645
New Semaphores, Minneapolis, Minn..... 659
Bureau of Street Traffic Research Created.... 689
See also "Accident Prevention"

Transportation
What Size City Best Served by Busses Alone? 32
New Ford Delivery Truck..... 113
Motor-Bus Inspector 217
Why a Transportation Survey!..... 286
Motor Vehicle Registrations..... 296
Electric Trucks 375
Solving the Bus Terminal Problem..... 650

Tree Planting—See "Forestry"

Utilities, Public
Successful Operation of Public Utilities, Jamestown, N. Y..... 368
San Francisco's Five-Cent Fare. 418
Public Utility Plant, Willits, Calif..... 422
See also "Lighting," "Municipal Ownership," "Power-Plants," "Transportation," "Water-Supply"

Waste Collection and Disposal
Elimination of Odors from Garbage Disposal Works 150
Costs of Garbage Collection in Columbus, Ga... 261
Rubbish Disposal, Highland Park, Mich..... 265
Incinerator Tests, McKee's Rocks, Pa..... 387
Kansas City Garbage Contract Confirmed..... 392
Cost of Refuse Collection in Boston..... 399
Chicago Incinerator Contract Awarded..... 577

Water-Front Development
Harbor Development in Baltimore..... 420
Harrisburg's Park and River-Front Development 586

Water-Supply and Water-Works
Relation of Water-Supply to Zoning..... 7
Water-Supply Statistics continued..... 47
(See also February to June, 1925)
Graphic Water-Level Recorder..... 103
Increased Well-Capacity, Mt. Clemens, Mich.. 103
Keeping a Town Wet, Williston, N. Dak..... 111
Water Purifiers Meet..... 113
Centrifugally Cast Concrete Pipe..... 115
Sludge Removal, Kansas City, Mo..... 117
Tank-Level Controller 123
Overcoming Corrosion in a Distribution System, Charleston, S. C..... 163
Charges Against Vacant Lots for Water-Mains.. 168
Causes of Breaks in Cast Iron Mains..... 174
Water-Waste Survey, Middletown, N. Y..... 184
14,000,000-Gallon Well Development, Houston, Texas 213
A Traveling Plea for Sterilization of Water-Supplies 213
New Deep Wells..... 221
Milholland Dam, Los Angeles.....Sept. cover, 258
Diesel-Engine-operated Municipal Water-Works 226, 400
Care of Concrete-lined Reservoirs..... 234
Mohawk Reservoir and Pump-Station, Tulsa, Okla. 237
New Littleton Reservoir, London..... 247
A 10.6 Per Cent Return on Investment in Small Water Plant, Trenton, Mo..... 251
Service Reservoirs and Desirable Pressures for Domestic Service 253
Portable Water-Waste Detectors..... 262
Cooperation Between Fire and Water Departments 283
City's Power to Furnish Water for Church Swimming Pool 311
Reinforced Concrete Pipe 325
New Portable Lead Furnace 329
Remote Control for Motor Operation of Water-Main Valves 329
New High-Capacity Chlorinator 337
A Pipe-Pushing Machine 347
Meterization, Evansville, Ind..... 393
Typhoid Due to Cross-Connections..... 395
Elaborate Plant for Small Town, Willits, Calif. 422
Chicago Votes to Install Water-Meters..... 437
Slip Joints for Setting of Large Meters..... 451
Sedimentation in Water Treatment..... 469
Experiences with Small Service Pipes..... 476
Santa Monica's Rebuilt Water System..... 492
Water-Works Electrification, Dayton, Ohio.... 506
Water Purification Plant Design and Operation 530
Municipal Water Treatment Plant, Newark, Ohio 599
Aeration of Well Water, Martin, Tenn..... 623
The Staunton, Va., Water-Supply Project..... 635
Machinery vs. Hand Labor in Pipe-Laying, New Bedford, Mass. 643

Weights and Measures
To Test Taximeters..... 182

Year Book
The 1926 Municipal Index..... 396

Zoning Notes.....91, 200, 313, 439, 565, 685
See also "City Planning"

Index to Places

Akron, Ohio
Street improvement specifications 161
Amarillo, Texas
City manager plan..... 293
Amsterdam, Holland
New city hall 665
Andes, N. Y.
New fire truck..... 61
Ashland, Wis.
Municipal music 288
Atchison, Kans.
City manager plan 293
Atlanta, Ga.
Fire truck 405
Audubon, Iowa
Memorial hall and municipal building 659
Bakersfield, Calif.
City manager plan..... 293
Baltimore, Md.
Sewer division trouble truck 9
Breaks in water-mains 174
War memorial building.... 189
Flashing beacons at safety isles 260
Harbor development 420
Bituminous street repair methods 604
Bay City, Mich.
City manager plan 293
Beaufort, S. C.
Progress toward reducing fire insurance rates.... 660
Beaumont, Texas
Municipal Christmas tree.. 661
Beaver Dam, Wis.
Park comfort station..... 616
Belleair, Fla.
Tractor mower 339
Bellingham, Wash.
Tractor and shoveler..... 583
Berkeley, Calif.
Municipal salary study.... 419
Berlin, Germany
Bridging over Potsdamer Platz 181
Birmingham, Ala.
"Know Birmingham"..... 18
Biwabik, Minn.
Arterial highway ordinance 527
Bluefield, W. Va.
School bonds voted..... 66
Commissions to traffic officers abolished 66
New Municipal building.. 259
City manager plan..... 294
Boise, Idaho
Community drama 655
Boston, Mass.
Declaration of Independence on Boston Common..... 79
Refuse collection costs.... 399
Educational motion pictures 500
Traffic studies 543
Bus terminal problem..... 650
Boulder, Colo.
City manager plan retained 605
Bradford, Pa.
Improvements 66
Brookfield, Ill.
Diesel-engine-operated water-works 226, 403
Brooklyn, N. Y.
Community centers 537
Burlington, N. J.
Farmers' market 549
Butler, Pa.
Traffic signal lights..... 187
California
Regional plan for San Francisco Bay counties.... 22
Camden, N. J.
Community hotel 459
Canada
Central heating 44
Canton, Ohio
Sprinkling-filter reconstruction 609
Chanute, Kans.
Memorial building and city hall 67
Chariton, Iowa
Diesel-engine-operated water-works 226
Charleston, Ill.
Diesel-engine-operated water-works 226, 404
Charleston, S. C.
Overcoming corrosion..... 163
Small service pipes..... 476
Charlotte, N. C.
New municipal group..... 186
Chicago, Ill.
Programs for playgrounds.. 4
Residential street-lighting program 26
Chicago our first city-state? 127
Vote to install water-meters 437
Incinerator contract awarded 577
Cincinnati, Ohio
Welsbach service contract. 215
Clarksburg, W. Va.
City manager plan..... 294
Cleveland, Ohio
Cleaning up city dump with tractor 61
Down-town traffic and parking regulation 73
Municipal markets 149
Street lighting 297
P. R. upheld 305
Grading on new air field 341
Traffic accidents to children 364
Bus terminal 650
Pageant-masque 654
Colorado Springs, Colo.
Power-plant 173
City manager plan..... 294
Columbus, Ga.
Garbage collection costs.. 261
Connecticut
Typical road slab..... 417
Covington, Ky.
New deep wells 221
Cuba
Tractor vs. ox in road-building 105
Dallas, Texas
Selling city planning to Dallas 140
Davenport, Iowa
Water-waste detectors.... 264
Dayton, Ohio
Keeping down fire loss.... 83
Water-works electrification 506
Typhoid prevented by milk pasteurization 669
Decatur, Ga.
Fire truck 341
Decorah, Iowa
Diesel-engine-operated water-works 226
Delaware
Typical road slab..... 417
Des Moines, Iowa
City planning 349
Keosauqua Way...October cover
Detroit, Mich.
Municipal railway operation 28
Arson squad 71
Ten-year financial program 83
Paving for residence streets 489, 637
Chlorination of bathing-beach water 495
Dodgeville, Wis.
Diesel-engine-operated water-works 226, 402
Dubuque, Iowa
City manager plan..... 294
Duluth, Minn.
Airplane patrol for forest fires 658
East Cleveland, Ohio
City manager plan..... 295
East Sparta, Ohio
Handling material for sprinkling-filter reconstruction 609
Eau Claire, Wis.
Rest room and comfort station 615
Elmira, N. Y.
Historical pageant 653
England
Street-widening and building line procedure..... 596
Escanaba, Mich.
City manager plan..... 295
El Dorado, Kans.
City manager plan..... 295
Elizabeth, N. J.
Statue to volunteer firemen 528
Elkhorn, Wis.
Diesel-engine-operated water-works 226, 402
Eugene, Ore.
Recreational program 484
Evansville, Ind.
Metered water 393
Fayette Co., Ind.
Care of bridge floors..... 24
Flint, Mich.
Christmas package wrapping station 662
Florence, S. C.
Bonds to complete park.... 528
Florida
Community advertising.... 296
Safety playgrounds..... 542
Fond du Lac, Wis.
Diesel-engine-operated water-works 226, 402
Fresno, Calif.
Playgrounds by bond issues and gifts..... 657
Galva, Ill.
Diesel-engine-operated water-works 226, 402
Geneseo, N. Y.
Water-waste detectors.... 265
Geneva, N. Y.
Highway sign at night.... 646
Germany
Traffic-control methods 377
Gloversville, N. Y.
Protection against fake stock promoters 67
Grand Rapids, Mich.
Vote for annexation..... 185
Zoning ordinance 248
City manager plan..... 295
Greensboro, N. C.
Park lands donated 287
City manager plan..... 295
Municipal stadium 654
Greenville, S. C.
Road-paving race 192
Grosse Park, Mich.
Unique street lighting.... 121
Hammond, Ind.
Sewage pumping-station.... 167
Harrisburg, Pa.
Park and river-front..... 586
Concrete bridge 610
Hartford, Conn.
Bus terminal 651
Highland Park, Mich.
Rubbish disposal 265
Highland Park, Texas
Municipal building
July cover, 75
Hollywood, Calif.
Pilgrimage Play 656
Houston, Texas
Helping negro farmers.... 67
Well development 213
Hoxie, Kans.
Sewage treatment plant... 267
Huntington, Utah
Progress of county's schools 421
Huntington, W. Va.
Fire prevention 424
Hutchinson, Kans.
Recreation cabins 17
Illinois
Investigations of smoothness of pavements 397
Standard concrete pavement 415
Jamestown, N. Y.
Public utilities 368
Joliet, Ill.
Traffic control devices.... 185
Chamber of Commerce building 547
Kalamazoo, Mich.
City manager plan..... 295
Boulevard lighting system.. 597
Kansas City, Kans.
Expansion of utilities..... 341

Kansas City, Mo.
Sludge removal 117
Bond issues 386
Garbage contract 392
Trafficways Commission .. 431
Growing per capita costs.. 473
Kapelleveld, Belgium
La Cité Jardin 39
Kelso, Wash.
Union stage depot..... 651
Kewanee, Ill.
Engowm-nt for parks 191
Knoxville, Tenn.
Water-waste detectors.... 262
Bus terminal 651
Lakeland, Fla.
Police and fire stations.... 17
Lakewood, Ohio
Essay contest 288
La Porte, Ind.
Diesel-engine-operated water-works 226
Lincoln, Nebr.
Municipal coal and gasoline stations 459
London, Eng.
City bridges 247
Littleton Reservoir 247
Long Beach, Calif.
City manager plan..... 406
Los Angeles, Calif.
Mulholland Dam
September cover, 258
Pageant of the Wayfarer.. 653
Louisville, Ky.
Safety education 480
Lowell, Mass.
Community pageant 654
Lyme, Conn.
Art gallery 281
Lynchburg, Va.
City manager plan 406
Madison, Wis.
Oiling and comfort station 614
Malden, Mass.
Water-waste detectors..... 264
Mamaroneck, N. Y.
Fire-stations 612
Manchester, N. H.
Industrial housing 632
Mariemont, Ohio
Culverts 453
Marion, Iowa
Diesel-engine-operated water-works 226
Martin, Tenn.
Aeration of well water.... 623
Massachusetts
Snow removal 409
Country planning 514
McKee's Rocks, Pa.
Tests on new incinerator.. 387
Medina, N. Y.
Police and fire departments 16
Menominee Co., Mich.
Bituminous surface treatments 133
Michigan
Time limits for municipal bonds 380
Asphaltic concrete construction 384
Michigan City, Ind.
City manager plan 406
Middletown, N. Y.
Water-waste survey 184
Milton, Mass.
Water-waste detectors..... 264
Traffic studies 543
Milwaukee, Wis.
Model of sewage disposal plant 507
Minneapolis, Minn.
Re-zoned for safety..... 656
New semaphores 659
Minnesota
League of Municipalities.. 355
Arterial highway law 527
Airplane patrol for forest fires 658
Monroe Co., Ind.
Stone roads 25
Montgomery, Ala.
Municipal pool....August cover
Montreal, Canada
Fire-fighting at 10 degrees below zero 405
Mount Clemens, Mich.
Increased well capacity.... 103
Muskogee, Okla.
City manager plan 406
Nashville, Tenn.
Parthenon 260
Neenah, Wis.
Diesel-engine-operated water-works 226, 402
Newark, Ohio
Water treatment plant 599
New Bedford, Mass.
Machinery vs. hand labor in pipe laying 643
Newburgh, N. Y.
City manager plan 407
New Jersey
Charges against vacant lots for water-mains 168
Sheet asphalt paving on Lincoln Highway 273
Typical road slab 417
Municipalities unite in milk control work 652
New London, Conn.
City manager plan 407
New Orleans, La.
"America First" cards... 68
Newport News, Va.
City manager plan 407
New York City
Traffic signs 14
Vacation Service Bureau.. 79
$70,000,000 annually for charity 81
Police cards ..... 2[illegible]
Cards to warn criminals.. 280
New chlorinator 337
The Mayor and the budget 423
Narcotics seized in 1924.. 511
Award for plan to reduce crime 611
A "Help-Your-City" suggestion box 663
New York State
Electric lighting rates.... 271
Gas lighting rates 429
Wayside eating places.... 437
Vote for grade-crossing elimination 589
North Carolina
Safety fencing 579
North Warren, Pa.
Village civic club 519
Norwich, Conn.
Equalization of taxes 425
Ohio
Highway sign properly placed 646
Oklahoma City, Okla.
Water-waste detectors.... 264
Omaha, Nebr.
Kitchen in a city park 139
Bus terminal 651
Palos Verdes, Calif.
Town plan 666
Paris, France
International Congress of Cities 181, 486
Aerial views....Nov. cover, 486
Pasadena, Calif.
Why City Manager resigned 303
Improved illumination 488
Christmas celebration 662
Pennsylvania
Home-building by limited dividend and industrial corporations 132
Typical road slab 417
Perry, Iowa
Diesel-engine-operated water-works 226, 404
Petaluma, Calif.
Fire truck 517
Petersham, Mass.
Town hall 514
Philadelphia, Pa.
Cooperation in arson fight 69
Civic and commercial organizations work together.. 288
Phoenix, Ariz.
No trolleys after October 20 32
City manager plan 407
Pittsburg, Kans.
Sewage treatment plant... 267
Pittsburgh, Pa.
Fighting crime with tear gas 60
Budget and accounting procedure 360
Polo, Ill.
Diesel-engine-operated water-works 226, 402
Portage, Wis.
Diesel-engine-operated water-works 226, 404
Portland, Me.
Grounds around new buildings 223
Painted curbs 420
Portland, Ore.
Models of proposed improvements 62
Bus terminal 651
Rose festival 655
Portsmouth, Va.
City manager plan 408
Poughkeepsie, N. Y.
Snow-plows 250
Bus terminal 650
Providence, R. I.
Gasoline locomotive serves sewage works 138
Pueblo, Colo.
Conservancy project 381
Quincy, Mich.
Diesel-engine-operated water-works 226
Redondo Beach, Calif.
Flowers for city beautification 288
Rhode Island
Public recreation 197
City and town clerks organize 652
Richford, Vt.
Fire truck 598
Richmond, Calif.
New hotel 215
Rochester, N. Y.
Backfilling a sewer trench 107
Traffic zoning paint 333
City manager plan adopted 605
Rockford, Ill.
Surface treatment of brick pavements 148
Rome, N. Y.
Snow removal 231
Bus terminal 650
Roslyn, Pa.
Home-made fire apparatus. 527
Sabetha, Kans.
Municipal Christmas trees 661
Sacramento, Calif.
City manager plan 408
St. Louis, Mo.
Can Dallas learn from St. Louis? 141
Salina, Kans.
City manager plan 408
Salt Lake City, Utah
Summer civic opera 528
San Francisco, Calif.
Street lighting 246
Diamond Jubilee Week 385
Five-cent fare 419
San Jose, Calif.
City manager plan 408
Santa Barbara, Calif.
Fire loss due to no building code 371
Santa Monica, Calif.
Rebuilt water system 492
Sapulpa, Okla.
City manager plan 557
Pageant of Progress..... 654
Sault Ste. Marie, Mich.
City manager plan 557
Scarsdale, N. Y.
Water-waste detectors 263
Scranton, Pa.
Better recreation 170
Seattle, Wash.
Fire-boat 451
Shawnee, Okla.
Motorized fire department. 496
Sherman, Texas
City manager plan 557
Shreveport, La.
"No Traffic Law Violation Week" 547
Sioux City, Iowa
Municipal swimming pool.. 421
South Carolina
Highway sign 646
Spokane, Wash.
Celebrating Hallowe'en.... 419
Spooner, Wis.
Economical sprinkler 236

Springfield, Mass.
Bus terminal 651
Springfield, Mo.
"Tiny Town" 65
Springfield, Ohio
Fire truck 517
Games, birds and flowers in a subdivision 539
Spring Valley, Ill.
Diesel-engine-operated water-works 226
Stafford Springs, Conn.
Water-waste detectors.... 264
Staunton, Va.
Water-supply project 635
Summit, N. J.
Ordinance for sanitation in eating places 657
Sydney, Australia
The Sydney zoo 518
Syracuse, N. Y.
Sewage treatment works 356, 501
Tacoma, Wash.
Water-waste detectors 264
Tampa, Fla.
City manager plan 557
Taylorville, Ill.
Diesel-engine-operated water-works 226, 463
Temple, Texas
City manager plan 559
Toledo, Ohio.
Bond issues 388
Airplane view..December cover
New Chamber of Commerce home 671
Trenton, Mo.
Water plant 251
Tulsa, Okla.
Mohawk Reservoir 237
Utah
Budget procedure for municipalities 261
Ventura, Calif.
Poinsettia festival 425
Wakefield, Mass.
Street sections proposed... 619
Walla Walla, Wash.
Pioneer pageant 653
Warren Co., N. J.
Snow removal 343
Warren Co., N. Y.
Winter road maintenance.. 641
Washington, D. C.
Guiding the city's growth.. 40
Making our capital safe.. 129
Model of cottage institution 380
Method of planting trees.. 524
Liability for dark streets.. 535
Wauwatosa, Wis.
Small comfort station..... 617
Wellsburg, W. Va.
Paving through petition .. 19
Weston, Mass.
Replanning 29
West Palm Beach, Fla.
Switchboard at City Hall.. 657
West Pittston, Pa.
Road roller 219
West Virginia
Pusher-type snow-plows... 245
White Plains, N. Y.
Jacking up a fire truck.... 699
Wichita, Kans.
City manager plan 559
Williston, N. Dak.
Keeping the town wet 111
Willits, Calif.
Public utility plant 422
Winona Lake, Ind.
Typhoid due to cross-connections 395
Wisconsin
Public comfort stations 613
Wythe Co., Va.
Grading outfit 250

Index to Authors

Adams, John D..... 425
Adams, Walter S.... 187
Aleshire, E. S..... 424
Ayrault, J. Allen.... 16

Barker, Henry Ames. 197
Barnard, Seymour
Bartholomew, Harland 38
Bassett, Edward M.. 178
Becker, Ray E..... 295
Bentley, S. R..... 294
Betts, F. L..... 133
Black, Russell Van Nest 22
Blanton, W. N..... 500
Boyce, Earnest..... 266
Bowerman, George F. 608
Bradbury, E. A..... 288
Breed, H. Eltinge.. 414
Bretz, C. E..... 264
Brevick, Conrad 66
Brinkerhoff, H. A... 421
Brophy, Edward J.. 60
Bugbee, J. W..... 138

Calver, Homer N.... 671
Carlson, Samuel A.. 368
Carter, John A..... 264
Cauchon, Noulan.... 145
Chamberlain, Neville 125
Cheney, Charles H.. 371
Christensen, L. R... 527
Clemmer, H. F..... 397
Cook, Robert V.... 226
Coolidge, Calvin.... 1
Crandell, John S.... 157
Crane, Jacob L., Jr. 143
Cron, F. H..... 295
Cumming, H. S..... 509

Davis, James J..... 137
Day, Willard F..... 635
Donaldson, Wellington 530
Dougherty, William J. 223
Doyle, William P.... 231

Eldridge, M. O..... 129
Elliott, Harris 293
Ellis, M. C. 127
English, C. H..... 4
Ennis, H. R 177
Erickson, Orrin 519

Fagerstrom, Arthur W. 288
Favrot, Leo M..... 194
Fesler, Mayo 305
Finney, Mary Louise 645
Fissell, Carl..... 239
Foard, Charles F. H. 604
Fonde, Stuart..... 262
Fox, Genevieve..... 139

Gaither, Charles D.. 260
Gallaway, G. Robert. 192
Gerke, Florence Holmes 62
Gerstung, August... 528
Gibson, J. E... 163, 476
Giddings, R. O..... 294
Gleason, M. J..... 295
Gray, B. E..... 245
Greeley, Samuel A.. 156
Griffen, Russell F... 185

Haas, O. F..... 626
Hall, Frances G., Jr. 528
Hamilton, Geo. H... 539
Hanna, U. S..... 25
Harmon, George W.. 236
Harper, Fred M.... 187
Harris, Emerson P.. 427
Hartman, Edward T. 11
Hatcher, M. P..... 251
Heffernan, D. A.... 264
Henshaw, Franklin.. 263
Hill, Norman H..... 557
Hole, L. H., Jr..... 295
Hubbard, Prevost... 33
Hutson, A. C..... 253

Jackson, F. D..... 559
Jacobs, Philip P.... 664
Jamison, J. H. 419
Johnson, Lamont.... 421
Jordan, Frank C.... 283

Kaiser, C. T..... 599
Ketchum, Charles M. 287
Kiersted, Wynkoop.. 469
King, Frank R..... 613
Kissell, H. S..... 539
Knowles, Morris ... 3
Korschen, John A... 184
Kressman, Margaret. 484
Kunigk, W. A..... 263

Larrick, C. R..... 67
Larrimore, George S. 19
Lawlor, J. P..... 623
Lawson, Jack F.... 173
Lewis, D. Hodson.. 17
Lewis, Harold M.... 474
Lewis, John S..... 261
Lilley, D. H.... 186, 547
Louis, Otto F..... 294
Lovell, C. A..... 15
Lynch, Hugh E..... 248

MacMurray, George J. 650
McCain, Earl C..... 381
McCauley, H. A..... 557
McDonnell, R. E.... 234
McFarland, J. Horace 586
McGuire, D. D..... 397
McKinney, F. W.... 420
McNair, William N.. 137
Malcolmson, Robert J. 626
Markle, Herbert.... 294
Markman, Samuel K. 298
Mason, Walt..... 19
Mendenhall, Herbert D. 542
Merriam, Charles E.. 289
Mesnar, R. O..... 374
Miller, G. E..... 627
Morris, Edward ... 422
Morrison, Charles W. 528
Munro, William Bennett 592
Murphy, Charles E . 273
Murray, Bertram E.. 641

Nason, Wayne C.... 29
Norman, Earl E..... 597

O'Rourke, John J... 427

Pack, Charles Lathrop 42
Pangburn, Weaver... 170
Patterson, R. B..... 627
Peaslee, Horace W.. 189
Piper, Clyde 24
Pirnie, Malcolm..... 7

Quarles, E. A. 521

Reed, Thomas H.... 20
Reynolds, Martha B.. 653
Ridgway, Robert.... 677
Ridley, Clarence E.. 260
Ries, Estelle H..... 281
Riggs, J. N..... 293
Robb, Carroll E.... 290
Roberts, Edward A.. 286
Rolph, T. W..... 628
Rosengarten, Walter E. 481
Rule, Burt..... 68
Russell, Leonard W. 389, 503

Saxton, Frank G.... 675
Schoen, Jean 518
Schwabe, Walter P . 26
Shanks, Sanders, Jr. 89, 201, 307, 437, 567, 689
Shepherd, C. H..... 166
Shurtleff, Arthur A. 41, 543
Siems, V. Bernard.. 174
Simmons, Lee..... 557
Slippy, J. C..... 360
Smith, Mabell S. C. 513
Smith, Russell E.... 66
Snyder, Thomas E.. 509
Spencer, W. A. 559
Steinmetz, T. A.... 289
Stewart, Charlotte.. 529
Street, A. L. H. 85, 198, 309, 433, 561, 681
Streithof, Charles... 393
Stroud, Robert H... 67
Sumner, John S..... 553
Swan, Herbert S.... 172

Taylor, Stephen H.. 643
Tillinghast, C. W.... 549
Timmons, William R. 193
Townsend, J. R..... 211

Van Zandt, J. Newton 496

Ward, Chas. E..... 294
Wardle, A. N..... 237
Waugh, Frank A.... 514
Weaver, James B... 349
Wehner, F. M..... 377
White, F. B., Jr..... 264
Whitney, Rich D.... 629
Wickham, R. S..... 9
Wickliffe, B. E..... 169
Wiker, E. E..... 425
Wilcox, Delos F. ... 275
Willette, R. T..... 293
Williams, Frank B. 91, 200, 313, 439, 565, 687
Williams, Sidney J.. 228
Wilson, Guy P..... 296
Wolf, August..... 420
Wolpert, Nathan Nelson 620
Wood, L. A. S..... 629
Woodrum, Raymond. 66

Yawger, T. H..... 630
Young, A. J..... 295
Young, Robert N.... 261

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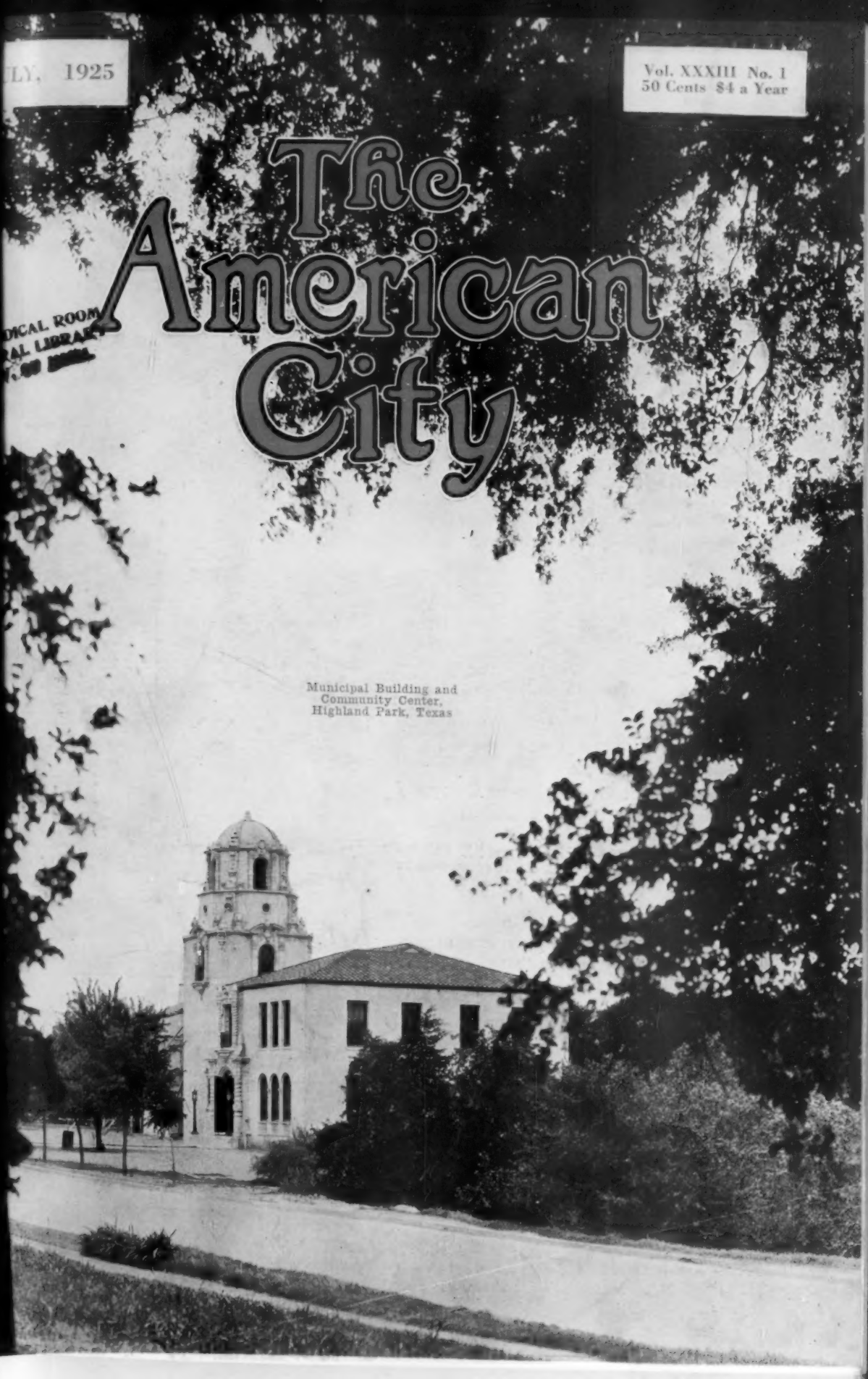

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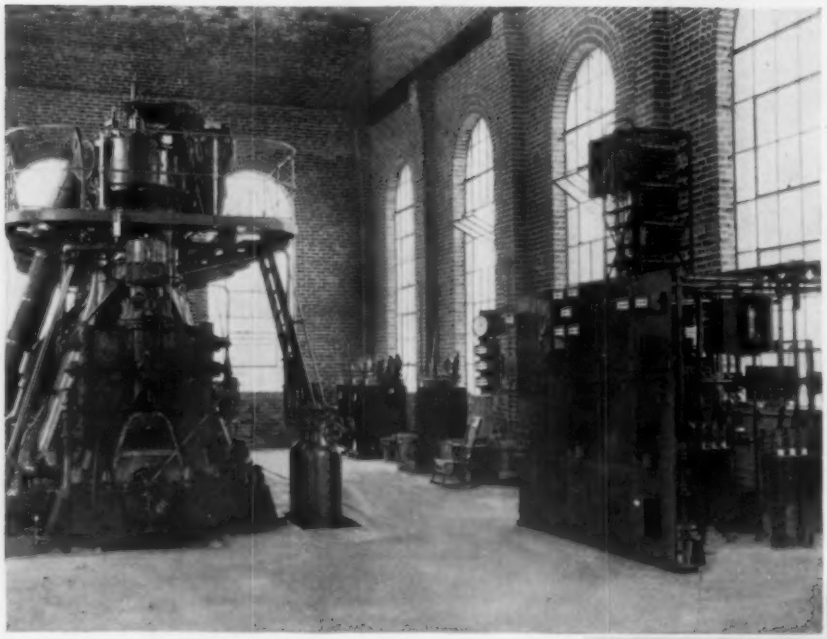

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A Plea for Fundamental Consideration of Congestion in Cities

By Calvin Coolidge

THE coming of millions of motor cars brought a highway crisis. It took one form in the cities, and another form in the country. The motor-car invasion found the open country with plenty of room for the new vehicles, but without fit roads. On the other hand, it found cities and towns that had been laid out and built at a time when it was impossible to anticipate the traffic congestion that the motor cars precipitated. The open country has dealt with its part of this problem by providing good roads on an amazing scale, and at a tremendous cost. The cities were not able to adjust themselves so quickly, and so they confronted a situation which plainly implied the necessity for completely overhauling and reshaping their highway and traffic systems.

It is perfectly plain that if, when our cities and towns were first laid out, the motor-car revolution could have been anticipated, both ground plans and structures would have been arranged on widely different lines. The relations between business, and residence, and industrial districts would have been vastly different. Convenient and adequate parking spaces would have been provided, quite as a matter of course. One cannot help wondering how a model city, adapted to the conditions they all now confront, would have been organized if from its beginnings these conditions could have been foreseen.

But that speculation has little more than an academic value to us. Our city and town authorities are called to deal with the practical question of adjusting themselves to conditions that could not have possibly been anticipated. Billions of dollars in property value, not to mention the whole mode of living for many millions of people, are involved.

It seems fairly certain that if, a half-century ago, men could have foreseen this transportation revolution, they would have agreed that it meant an end to the congestion of population in the limited areas of cities. It would have been assumed that when once the business man and the working man found themselves able to live many miles away from their employment, there would immediately

A Document Worth Preserving

As a former mayor and governor, President Coolidge brought to the White House an exceptional insight into municipal problems. Probably no other utterance of his has evoked such uniformly favorable comment from civic leaders who have happened to read it in the newspapers as the address which he delivered in Washington on May 1 to the secretaries of approximately 125 automobile clubs. For the benefit of any of our readers whose attention has not already been called to this address, and as a means of preserving the document for reference purposes, the President's remarks, with the exception of the introductory words of greeting, are here published in full.

begin a sweeping redistribution of population, spreading it over wider areas and organizing it in quite different communities. Yet experience has been quite the contrary. Instead of using the new transit facilities to end overcrowding, people have seemed determined to crowd themselves more than ever. The apartment house, the sky-scraping commercial building, and the elevator have tended to increase congestion. Electric railways, subways, and motor cars have tended to diffusion of the people. It must be said that thus far the victories have been all on the side of the skyscrapers, the elevators, and an ever-increasing congestion of population.

Some recent studies by engineers and sociologists have led to doubts whether the superior efficiency of the very great cities as business, industrial, and cultural centers can be taken altogether for granted. They have advantages, but also disadvantages; and the disadvantages seem to be multiplying faster.

I do not presume to judge between those investigators who conclude that the cities must inevitably go on with their rapid rate of growth, and those others who tell us that transportation and industrial programs must be made to counteract this tendency, and bring diffusion of the population masses. But it must be apparent that, whichever view is correct, many and difficult and costly readjustments must be made. There is need for concerted, fundamental, and courageous consideration of all the questions involved. They reach a hundred times deeper than the mere superficial problem of getting streams of motor cars moved through city streets. They have to do with the elementals of social organization. They concern vital phases of community welfare and progress. The physical configuration of our cities, the direction of the mighty currents of the nation's commerce, the continent-wide distribution of population and industry—these are all included among the problems with which you gentlemen are dealing. I cannot too earnestly urge you to take the broadest and most inclusive view of them. You will be in no danger of overemphasizing them. You will help most if you will visualize them to yourselves, and help the rest of us to visualize them, in their actual character and full proportions.

New Financial Statistics of Cities from the Bureau of the Census

Operating Costs, Assessed Valuation, Per Capita Levies, and Net Debts of Municipalities

THE AMERICAN CITY is indebted to the Bureau of the Census, Department of Commerce, for the following tabulations from a forthcoming report on "Financial Statistics of Cities: 1923." The report will give detailed statistics for 248 cities* having a population of over 30,000, divided into five groups as follows:

Group I—12 cities of over 500,000 inhabitants
Group II—11 cities of 300,000 to 500,000
Group III—53 cities of 100,000 to 300,000
Group IV—81 cities of 50,000 to 100,000
Group V—91 cities of 30,000 to 50,000

In a letter dated June 2, 1925, W. M. Steuart, Director of the Census, writes to the editor of THE AMERICAN CITY:

"In compliance with your request, I have had prepared a table similar to the one included in your MUNICIPAL INDEX for 1924. In this special table for 1923, you will note the high per capita and the large per cent of the total in Groups I and II for General Government. The expenses of General Government include the expenses of courts; and in cities of over 300,000 population, as Chicago, Cleveland, Cincinnati, and others, a per cent of the total pavements of the county are included in order to make such cities comparable with those in the same population groups that do not have county organization, as Baltimore, Philadelphia, and New York. The cities in Groups III, IV, and V, with the exception of Denver, Colo., do not have all of the courts, but only the municipal court, as a rule.

"I wish also to call your attention to the fact that in securing the statistics for 1923 it was decided to include in the investigation only those cities that had an actual population of 30,000 or over at the census of 1920 or at a succeeding local census taken under the supervision of the Census Bureau. The report for 1923 therefore covers 248 cities, while the report for 1922 included data for 261 cities. This accounts for the decrease in amounts in Group V for 1923."

*For 170 of these cities, for which reports were available in January last, some of the individual figures are given in THE MUNICIPAL INDEX for 1925, pages 19-31.

The final report, which will be available from the Bureau of the Census in a short time, will give much additional information relating to revenue receipts from taxes, special assessments, fines, forfeits, subventions, donations, highway privileges, rents, interest, and earnings from general departments and from public service enterprises; also a table giving expenditures in detail by governmental departments payments of interest, and capital outlay, and will include per cent distribution and per capita tables on both revenue receipts and governmental-cost payments. There will be tables showing the assets of the cities, the gross debt outstanding and the purpose for which it was issued, the rate of interest for such debt, also a number of additional tables.

GOVERNMENTAL-COST PAYMENTS FOR OPERATION AND MAINTENANCE OF GENERAL DEPARTMENTS OF MUNICIPALITIES IN 1923 (OTHER THAN FOR PUBLIC SERVICE ENTERPRISES)

	Group I	Group II	Group III	Group IV	Group V
Total for All General Departments	$699,149,070	$161,138,606	$236,401,869	$147,369,246	$93,817,276
Per capita	40.39	37.95	28.17	26.36	25.81
General Government	71,117,136	15,467,759	14,113,700	8,939,064	6,021,298
Per capita	4.11	3.64	1.68	1.60	1.66
Per cent of total	10.2	9.6	6.0	6.1	6.4
Protection to Person and Property	139,363,030	32,692,983	50,225,302	29,327,922	17,533,196
Per capita	8.05	7.71	5.98	5.24	4.82
Per cent of total	20.0	20.3	21.3	19.9	18.7
Health	15,597,458	4,673,389	5,910,447	3,028,552	1,986,827
Per capita	0.90	1.10	0.70	0.54	0.55
Per cent of total	8.0	7.4	6.9	6.8	5.9
Sanitation	56,097,179	12,003,385	16,307,183	9,975,757	5,647,679
Per capita	3.24	2.83	1.94	1.78	1.53
Per cent of total	2.2	2.9	2.5	2.1	2.1
Highways	58,203,030	14,090,866	23,518,005	13,985,688	10,166,562
Per capita	3.37	3.32	2.80	2.50	2.80
Per cent of total	8.3	8.7	10.0	9.5	10.9
Charities, Hospitals, and Corrections	48,872,722	12,903,659	9,100,408	4,978,191	2,928,279
Per capita	2.82	3.04	1.08	0.89	0.81
Per cent of total	7.0	8.0	3.8	3.4	3.1
Schools	239,084,983	56,578,819	98,823,914	67,097,416	42,922,843
Per capita	13.81	13.32	11.78	12.00	11.81
Per cent of total	34.2	35.1	41.8	45.5	45.8
Libraries	8,071,591	2,251,324	3,097,697	2,064,263	1,380,133
Per capita	0.47	0.53	0.37	0.37	0.38
Per cent of total	1.2	1.4	1.3	1.4	1.5
Recreation	23,621,568	5,277,016	7,753,592	4,258,553	2,638,093
Per capita	1.36	1.24	0.92	0.76	0.73
Per cent of total	3.4	3.3	3.3	2.9	2.8
Miscellaneous	39,120,373	5,199,406	7,551,621	3,713,840	2,692,366
Per capita	2.26	1.22	0.90	0.66	0.74
Per cent of total	5.6	3.2	3.2	2.5	2.9

ASSESSED VALUATIONS, PER CAPITA LEVIES, AND NET DEBTS IN 1923

	Group I	Group II	Group III	Group IV	Group V
Assessed valuation per capita subject to general property tax for government of city	$1,579.36	$1,473.91	$1,292.74	$1,220.48	$1,060.69
Per capita levy of general property tax for all purposes	47.15	44.47	39.22	38.25	35.41
Per capita levy of general property tax for government of city	45.03	40.46	29.94	28.86	27.43
Net debt at close of year	2,170,196,383	459,213,251	662,629,847	370,350,560	213,989,467
Net debt per capita	125.39	108.14	78.96	66.25	58.87

City Planning as a Permanent Solution of the Traffic Problem

By Morris Knowles

TRAFFIC control under existing street conditions will not afford a solution to the problem. The method of accomplishing permanent results is in planning for the future and the replanning of things as they exist. Some of these items of importance to be studied and planned are:

1. Improvement of intersections by the rounding of corners.
2. Removal of obstructions to view at intersections, classification of use, and limitations of congestion through the use of the power of zoning.
3. Provision for the separation of traffic or grades at important intersections.
4. Removal of pedestrian traffic at street crossings by use of overhead walks or underpass ways.
5. Widening and straightening of streets where feasible and practicable.
6. Cutting through of new streets where the need is such as to justify the cost.
7. Segregation of different kinds of traffic, not only by regulating, but principally by the design of appropriate facilities.
8. Building of loops around central business districts.
9. By-passing of through traffic around congested areas by building of appropriate highways in the outskirts of the city.
10. Construction of rapid-transit facilities, either overhead or underground, not only for street railway, but sometimes for vehicular traffic.
11. Elimination of railway grade crossings.
12. Removal of parked machines from the streets, by providing other facilities, so as to preserve available width for moving traffic.
13. Provision of playgrounds and recreation centers in suitable number and suitably located.

Proper planning in the future, readjustment of existing streets and further development of the traffic regulations can do much toward the promotion of safety on the highways, and even more towards the speeding up of travel. We suffer from the narrow streets, from the high buildings, in business centers, from the lack of the stabilizing influences of zoning, from poor planning, and the inadequacy of arterial highways. It is only by a comprehensive plan, by a continual vigilance in its operation and carrying out, by readapting it to changing needs and reasonable future requirements, that the traffic problem can be solved and the city kept in its highest state of efficiency.

—Conclusions from a paper presented at the International Town, City and Regional Planning Conference, in New York, April, 1925.

Program Building for Playgrounds

By C. H. English

Director, Bureau of Recreation, Board of Education, Chicago

THE two most important essentials to successful playground administration are efficient personnel and a scientific program.

For many years we followed a pattern formulated by physical educators which naturally was based upon athletic and sports participation. Playground workers were very largely secured from the ranks of physical education, there being no other dependable source from which to draw. The more recent concept of playground function, particularly in the field of education, has served to draw a sharper line of action and method between physical education and playground and recreation activities.

THIS FLOAT WON SECOND PRIZE FOR WORKMANSHIP IN THE PLAYGROUND MARDI GRAS, GRANT PARK, CHICAGO

While sports and athletics still hold a most important place in the playground program, the newer phases of handcraft, the arts, esthetic and mental activities, are also crowding rapidly to the front, demanding attention and promotion.

The recreation executive today has adopted the policy of mass participation, combined with an opportunity for every child to express his desires, no matter how varied they may be. This requires a carefully planned program. The tendency in athletics is toward specialization on team development. This is particularly true when competition is used to any extent. Time and space preclude limitless teams and leagues. Many boys and girls were therefore left out of the joy and stimulation of competition. They had the choice either of being "rooters" or of seeking out apparatus as their means of play employment. It has become clear that other forms of activity must be promoted for them. Then, too, there are a host of children who, because of physical defects and lack of coordination, are too timid to try the sports events, and are left to shift for themselves. To these types, as well as to the athletically inclined, the balanced program affords the joy of achievement, of creation, and of mental stimulation so esential in character development.

Balloting by the Children on Playground Activities

If the concept to-day is changing, and playground activities have a more inclusive range, so have we to recognize a decided change in the boys and girls themselves. The methods used in 1918 will not be successful to-day. An index

THE FLOWER-GARDEN FLOAT THAT WON SECOND PLACE FOR ORIGINALITY IN THE FIRST ANNUAL PLAYGROUND MARDI GRAS, IN GRANT PARK, CHICAGO

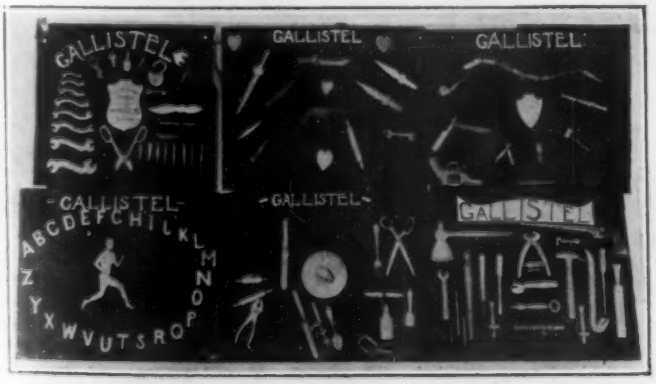
to the new situation confronting playground workers was given us in Chicago when the results of a playground ballot on activities were recently tabulated and studied. V. K. Brown, Superintendent of the South Park System, and the writer held an election in November in which we sought to put the "acid test" of our respective programs fairly up to the youngsters who had participated in them the past year.

Over 20,000 ballots were turned in, representing more than 300,000 individual checks on activity preferences. The ages ranged from 8 to 32 years. The percentages of desires for certain activities at various age groups indicate to us, at this first attempt to arrive at a sound basis of program building, that the boys and girls have advanced from 2 to 3 years up the scale formerly held as the proper age participation. In other words, the activity which in the past appealed to the 12-year-old boy is now being engaged in by the 9- or 10-year-old; and the girl of 12 has reached ahead in her appreciation and satisfaction of hungers to the 15-year-old stage of development. These are some of the factors that must be given consideration in planning the program, or else it will miss fire.

Another exceedingly important factor is that of duration of the event. Whether we like it or not, the children of to-day demand frequent changes. We, as adults, are apt to reach back in memory and remember parental warnings on "stick-to-it-ive-ness," and constancy of purpose. We must not be confused over attitudes of the child to-day, who seems to be more alert, is more accustomed to turn the various stimuli into action, thus fitting himself into the new social and environmental conditions of urban life. Even John Dewey recognizes this condition when in his little book on "Interest and Effort in Education" he says: "But the more elaborate the action, the longer the time required by the activity; the longer the time, the more the consummating or fulfilling stage is postponed; and the longer the postponement, the greater the opportunity for the interest in the end to come into conflict with interest in intervening steps."

And, again, he places importance on scope and method as follows: "Plays, games, occupations, of a consecutive sort, requiring both construction and manipulation, were recognized, practically for the first time since Plato, as of essential educational importance."

A FEW OF THE NOVELTY RADIO SETS IN THE SECOND ANNUAL CRYSTAL RADIO CONTEST IN THE CHICAGO PLAYGROUND
No one was allowed to spend more than $1.50 in construction



SOME OF THE 1,800 OBJECTS THAT WERE SUBMITTED IN THE SECOND ANNUAL PLAYGROUND WHITTLING AND CARVING CONTEST

Playground Events in Short Cycles

The events in our Chicago program were promoted on a two and sometimes three weeks' cycle. After a year's trial, the staff and supervisors pronounce the plan successful in maintaining interest, in producing a greater number of individual participants, and in uncovering potential talent apparently lying dormant.

The two weeks' cycle also gave the instructional staff a program of action which left no

time for idleness. The central office issued the events, methods, and regulations. It was up to the staff to organize and use ingenuity and initiative in working the project out. Suitable recognition of the best production was always given. The old-fashioned program idea of 15-minute periods during the day, such as appears in some of the books on playground technique, is obsolete. The type we mean is:

9:00 A. M.—Raising flag
9:15 A. M.—Singing
9:30 A. M.—Policing the ground
9:45 A. M.—Games, etc., etc

The issuance of the program by the executives, and requesting the staff to produce results, is by far the best method. Our playground department promoted 58 projects during the year 1924. We operate 60 year-round playgrounds. To complete a project means to hold a district- and system-wide competition in which all units are represented, and to declare the final winner. Activities are promoted uniformly on all the grounds, in two-week cycles. There is no lull between undertakings. You can readily see that the program under these conditions is alive. The children are now in the habit of saying: "Well, what's next?"

To describe the first year's experiment would take more space than is allowed in this article. Any one who is interested in getting the details may secure the Annual Report of the Bureau by addressing the writer at 460 South State Street, Chicago.

Developing Community Interests Through Junior Chambers of Commerce in the Schools

AT the April convention of the Eastern Commercial Teachers' Association, an address, prepared after consultation with thirty-two secretaries and sixteen educators, was delivered by Walter O. Lochner, Secretary of the Trenton Chamber of Commerce, on "The Community Interests That a Commercial Teacher Should Develop."

Among the many worth-while ideas embodied in the paper was the suggestion that an excellent opportunity to develop community interest is afforded the commercial teacher through organizing a Junior Chamber of Commerce, thereby assisting in developing citizenship ideals and civic pride and promoting a valuable fraternal spirit. Such activities in Trenton and Syracuse were outlined by Mr. Lochner as follows:

"In Trenton, membership in our High School Commerce Club (which is our Junior Chamber of Commerce) is limited to the honor students of the Commercial Department of our High School, as well as to the commercial teachers who may become honorary members. In Syracuse, N. Y., membership is limited to practically the same group of persons. Note the objects of the Syracuse Junior Chamber of Commerce of the Blodgett Vocational High School: 'To promote interest in our city and the business world; to encourage a higher scholastic standing among the commercial pupils; to bring about a closer relationship between the commercial pupils and the business world; to assist graduates in securing employment.'

"Both in Syracuse and in Trenton the commercial graduates who attained honor marks may become honorary members. It was my privilege recently to address the Commerce Club of our Trenton High School on the occasion of its recent anniversary dinner, and I can assure you that it was a real inspiration and privilege to mingle with this fine group of boys and girls. One of our leading judges presented merit badges to the students having attained the highest scholastic standing. It is my belief that the commercial department of the high school is the most appropriate field for organizing a Junior Chamber of Commerce, the same to be affiliated very closely with the senior organization of the city. But membership in the junior organization should by no means be limited to such an unrelated factor as the parent's membership in the senior body."

Treasury Debt Apparently Abandons Attempt to Tax Municipal Securities

THE following paragraph from a speech by the Secretary of the Treasury at the annual convention of the Mississippi Bankers Association, May 5, 1925, apparently defines the present attitude of Secretary Mellon and of the Treasury Department in the matter of tax-exempt securities:

"The Treasury has frequently recommended to Congress the adoption of a constitutional amendment, restricting further issues of tax-exempt securities. Personally, I feel that this is the strongest possible test of whether it is really desired to make wealth bear its part of the tax burden. All that is necessary is to close the door and thereby cut off this inviting avenue of escape from taxation. But apparently we cannot count on securing a constitutional amendment for the present. There is consequently no immediate remedy for the situation within the power of Congress except a readjustment of the surtaxes on a basis that will attract capital back into productive business and keep it from exhausting itself in tax-exempt securities or from taking advantage of the many other methods of investment by which taxes are avoided. This is the second course and the only one now open to us."

The Relation of Water-Supply to Zoning

By Malcolm Pirnie
Hazen & Whipple, Consulting Engineers, New York City

ZONING in relation to water-supply is not new, and water-supply engineers are familiar with the idea. Growing cities in hilly country early found it necessary to divide their distribution systems into low- and high-service districts, and successive buildng developments occupied the areas adequately served with water. In these cases the water-supply exerted considerable influence in restr'cting periodical growths within certain limits of elevation.

On account of the needs of large quantities of water for manufacturing purposes and the development of available water - powers, the shores of many rivers became factory zones in the infancy of cities; in fact, the location of many cities was primarily due to an adequate water - supply for industrial purposes. The height, bulk, and inflammable nature of buildings determine the water facilities for adequate fire protection, and where these have been regulated by building codes, fire protection zones exist in which different water pressures, capacities of mains, and type and spacing of hydrants are provided. Since the general acceptance of the germ theory of disease, there has existed also an exercise of the police power over the use of private properties lying within the watershed area of public water-supplies, to prevent the pollution of these supplies, and this action has established zones of sanitation.

The question under discusion has to do with the relation between zoning for height, bulk, and use of buildings, and the water-supply. Obviously, the well-ordered zoning of growing communities will effect considerable saving in first cost and cost of reinforcement of the distribution system. If the plan of a city indicates the limits of its industrial sections, its areas dedicated to high buildings, to apartment houses, to closely built two- and three-family houses, and to one-family houses, and the zoning ordinance places limits within the various areas on the height and bulk of the buildings, the present and future water requirements of the areas can be closely estimated. The distribution systems may then be designed for the ultimate development, and parts of it installed from time to time as required. If the early development of an area is scattered, a few feet of the ultimate mains may be laid with small, short-lived steel pipes in intermediate streets. In this way, every cast-iron main that is installed will remain in service indefinitely. Before streets are paved, the proper water - main with service connections, gates, and hydrants, can be installed.

Streets must accommodate pedestrian and vehicular traffic, street-car tracks, elevated and subway rapid-transit lines, electric light and power cables, telephone, telegraph, and signal conduits, sewers, gas pipes, and water-mains, and in some cities, the allocation of space above and below ground adequately to provide for these utilities has become a serious problem. New York found it expedient to drive a pressure tunnel under Manhattan Island with risers connecting with the exist-

Future Inconvenience and Expense Eliminated

The past uncertainty as to the trend of building has resulted in the replacement of small water-mains with large mains, under the most difficult construction circumstances. The removal of pipes that could have served the original type of development for many years, the cutting and replacing of pavements, and the interference with traffic, are constant sources of economic loss in American cities. In the adequate provision of water there are various degrees of aid that can be obtained through proper zoning. In the West Palm Beach and Palm Beach situation, the zoning of the catchment area is the only practical means by which an excellent and most economical source of water-supply can be preserved. In all communities, however, there will be financial loss due to the lack of stability in water-works building, as long as haphazard city building is allowed to continue. The importance of zoning in stabilizing the water-works business and continuing water as a relatively cheap commodity, is just as great as it is in otherwise conserving property values and promoting the health, safety, morals, and general welfare of communities.

ing distribution mains to supply the large and increasing consumption in lower Manhattan and Brooklyn. In spite of the great cost of this construction, it was demonstrated to be much less than the cost of equivalent service through additional pipe lines, even if it were possible to get them into the already crowded streets. A similar tunnel has recently been recommended to reinforce the overtaxed distribution system of Philadelphia.

The past uncertainty as to the trend of building has resulted in the replacement of small mains with large mains under the most difficult construction conditions. The removal of pipes that could have served the original type of development for many years, the cutting and replacing of pavements, and the interference with traffic, are constant sources of economic loss in American cities. When a residence street that was adequately served with a 6-inch main gives way to a block of apartment houses and hotels, lots that were formerly supplied through ¾-inch service pipes call for much larger services. The use of flush-valves in these buildings increases the peak demand for water, and the resultant inadequacy of water-main sometimes is not discovered until after an expensive pavement has been laid. The effect extends to connecting mains, and the remedy often requires the cutting of pavements and the replacement of small mains with larger ones throughout a considerable area. The construction of high apartment houses in a relatively high residential area may make it necessary to install a booster pumping-station and establish a high-service system. Such an area formerly may have been adequately served with water under the general distribution pressure, but with the substitution of high buildings for low, widely separated houses, comes the need for greater pressure for fire fighting and for giving service on top floors. Thus, among the many unnecessary costs attendant on haphazard city building, the wasteful expenditures for water facilities command an important place. Stability in existing water-works structures and in present provisions for the future water-supply of a community is dependent on stability in building and may be secured by the early adoption of a carefully prepared zoning plan and ordinance.

In preparing a zoning plan, the water-supply must be given due weight, with all purposes in view. Water has been, and still is, about the cheapest of all public necessities. Its cost in the future, however, will be greatly increased in some communities if the city plans are made without consulting the water authorities. It is possible even to destroy an existing source of water-supply by disregarding this phase of the problem, thus burdening the citizens with a cost for new works out of proportion to the benefits resulting from zoning.

Interesting Example

A striking instance of what can happen to a city water-supply when it is lost sight of in the midst of other and for the moment more spectacular developments, exists in the present situation at West Palm Beach and Palm Beach, Fla. These rapidly growing cities are situated on the east coast of southern Florida, somewhat more than 40 miles east of Lake Okeechobee. On the western edge of West Palm Beach, about 2 miles inland from the Atlantic Coast, are two shallow fresh-water lakes which are splendid natural impounding reservoirs. West of the lakes are the Everglades, with a general slope of 1 foot in 4 miles from Lake Okeechobee to the coast. The West Palm Beach lakes are in one of the natural outlet depressions which formerly discharged great quantities of water from the Everglades and were capable of supplying water to a population many times that of the present cities. The Everglades drainage operations have recently diverted the flow from the lakes, and the area naturally tributary to them is not large enough to furnish the water now needed. In order to avert a water shortage, it has been necessary to purchase large tracts of land and to construct several miles of canals, by means of which some of the lost drainage area has been reclaimed.

If some method can be found whereby the needed catchment area can be protected from further deep-drainage operations, the present source of supply can be saved. Otherwise, the cities must choose between a supply from Lake Okeechobee, pumped through a 45-mile pipe line, and a supply from the West Palm Beach drainage canal, which is subject to considerable pollution, is extremely hard, and will require expensive treatment. It is clearly best to conserve the present supply and to reclaim additional drainage areas by extending canals as required to meet the growing demands for water, provided the investment in such works is justified by zoning the area against other drainage operations.

ACKNOWLEDGMENT.—Reprinted from "The Influence of Zoning on the Design of Public Utilities," and "Zoning and Water-Supplies," pages 268-271, in the Proceedings of the American Society of Civil Engineers, February, 1925, Volume LI, No. 2.

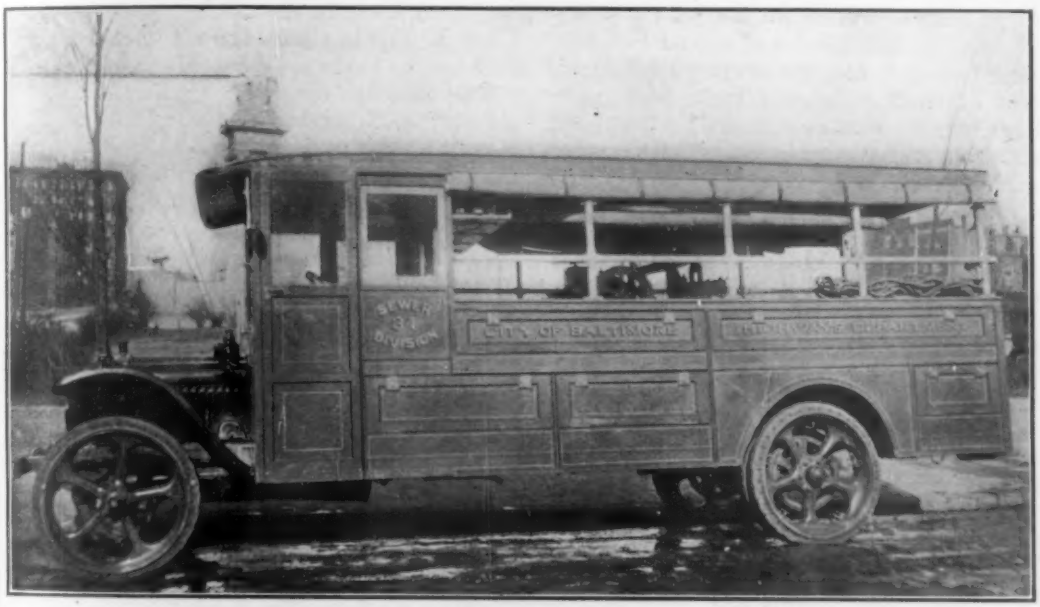
A Trouble Truck for the City Sewer Division

By R. S. Wickham

Assistant Engineer, Directing Sewer Maintenance, Baltimore, Md.

IN this time of specialized service, more exacting demands are being constantly made by the public upon municipal officials. These requirements usually have a standard set by the activities of private industry in similar lines where excellent service invariably returns a financial profit, and are, as a rule, difficult of fulfillment because of the restrictions placed upon public officials by yearly budgetary finance systems. If they are met at all under these circumstances, they must be met by devising means of rendering more service for a given sum rather than by an expansion of organization accompanied by increased costs.

All sewerage and drainage conduits in Baltimore, both open and closed, are maintained and operated by the Highways Engineer Department through its Sewer Division. There are in the city over 1,200 miles of such conduits, the total being made up of sanitary sewers, storm drains, culverts, and streams, all of which are subject, from time to time, to maintenance activities. The greater part of the service rendered to the public in connection with this work consists of relieving stoppages in house and lateral sanitary sewers and storm drainage conduits in times of rainy weather, and pumping water from residential cellars. In fact, the service dealt with in this article covers the entire field of drainage maintenance where it directly affects the well-being of privately owned property, and is in addition to the routine sewer-cleaning service, which is carried on uninterruptedly.



THE SEWER DIVISION TROUBLE TRUCK, BALTIMORE, MD.

The service is carried on by small gangs, usually containing two or three men, with several gangs reporting to a single foreman, the work being assigned by telephone from headquarters at regular intervals of from one to two hours. Previously, small trucks carrying limited equipment were used and, in general, one truck was not able to supply material, equipment, and transportation for more than one or two of the small gangs without periods of delay.

It was decided to employ a vehicle which

could carry from three to five of the small gangs, if necessary, and in addition, sufficient special tools so that each and all could be equipped for the various types of service necessary, without returning to headquarters. With this in mind, the truck illustrated was designed.

The body is mounted on a standard chassis, and has a slated type roof, rigidly supported by pipe columns, with completely closed cab. There are two curtains on each side and one in the rear for the protection of men and equipment in inclement weather. The cab sides are closed by a removable sliding door and a drop window on each side, which may be replaced by tarpaulin curtains during the warm months. There is ample room for four men on the seat in the cab.

Each side of the body is equipped with five boxes from 12 to 15 inches in depth and height, and, as will be noted from the photograph, of various lengths of from 2 to 6 feet. These boxes are designed to carry a full equipment of hand excavating tools, sewer-rods, drags, scoops, root cutters, steel cables, and other appurtenant tools of special nature which may be employed on the work, as well as rain-coats and boots for the men. The box doors are paneled and secured by brass hinges and catches. Attention is called to the lower forward box, which is so located as to utilize all the space under the driver's seat outside the standard chassis width. The entire box frame on each side is carried on special steel hangers securely bolted to the truck frame over subsills, permitting the bottom of the boxes to hang nearly 18 inches below the truck frame.

The inside of the truck is taken up by a longitudinal seat on each side 13 inches in width, formed by the back portion of the upper boxes, and an open space 2 feet 8 inches in width, both extending the entire length of the body from the back of the cab to the limit of the truck frame, a distance of 11 feet. The vehicle carries within this body space, one, and often two, single-cylinder, gasoline-driven diaphragm pumps mounted on low trucks. Chains, crossing the body, have been provided to keep these pumps in position while driving. When the pumps are properly loaded, eight men may be carried comfortably on the longitudinal seats. There are two 14-inch square, single-light windows in the back of the cab.

The columns supporting the roof are of 2-inch galvanized pipe with fittings to receive 1½-inch galvanized pipe rails, which are arranged to extend across the back of the boxes at the rear of the truck and downward as hand-rails for a set of hanging steps supported from the back member of the truck frame. Each column bears two 6-inch opening hose hooks which protrude into the body and are utilized for carrying suction hose.

Underneath the body floor, between the sills and on top of the chassis frame, sufficient space is provided to carry a plank skid 11 feet 6 inches long for unloading the pumps. The skid is formed of two 2 x 10-inch oak planks beveled longitudinally at the landing end and spaced by ⅛-inch thick plate steel cleats sunk flush in the plank. Edge binders of strap iron protruding ½-inch above the surface of the skid are provided to prevent the pump wheels from running off the skid while unloading. The rear truck frame member has eyes into which the skid hooks drop when the skid is pulled from underneath the body, and a locking device between these eyes keeps the skid in place when not in use. Cast steel towing hooks are mounted on the frame.

The lighting equipment consists of two electric headlights and two oil side-lights in front, with one standard tail-light mounted on the center of the body roof, and one red electric rear-light on each side of the body at the rear. It is contemplated to add a swivel-mounted 10-inch electric search-light at the front of the vehicle, to be controlled from the driver's cab, and a 30-foot extension cord with cage lamp inside the body, to be used for exploring the boxes at night. On the back of the cab is mounted a lantern rack providing space for sixteen oil lanterns. When in the rack, the lanterns are held firmly in place by spring cleats.

The entire body is painted khaki brown with black streaking and black and silver lettering. The truck is completely equipped to cope with any emergency that may arise in connection with the sewerage and drainage system, and is held ready to answer calls for service both night and day. It has been found possible with this vehicle to keep as many as six small gangs supplied with tools, equipment, and transportation from job to job without any return trips to the headquarters yard or the waste of any time on the part of gangs who have finished their work at a given location and are awaiting reassignment.

The Highways Department of Baltimore is under the direction of Bernard L. Crozier, Highways Engineer, with Milton J. Ruark, Division Engineer of Sewers, and the writer as Assistant Engineer, directing sewer maintenance.

To Prevent Hardening of Street Arteries

By Edward T. Hartman

State Consultant on Housing and Planning, Massachusetts Department of Public Welfare

The Function of Building Lines

THE function of building lines is two-fold:

1. To make possible the widening of a street, immediately, or at some future time measurably anticipated; or to make possible a widening which is not the immediate purpose of the building lines, but which the contingencies of the future may require.

2. To promote what the English call the amenities—beauty, health, safety, convenience; the things, in short, which all people seek in residential areas but which we have been remarkably slow in providing.

Some of the things which building lines promote or accomplish include: elasticity of the street system, thus preventing hardening of the arteries; lighting and ventilation of buildings and protection from noise, dust and fumes, thus promoting health and comfort; increased safety to life and limb, especially for children.

Well-planned building lines make possible lawns with flowers, shrubs, and trees; prevent the ruining of attractive areas already developed; do away with the hazards of expiring agreements by preventing the change of character of a region at the whim of a short-sighted or selfish owner. They make possible and even economical the widening of streets, and, if established before corners are developed for business, prevent untold damage.

Street Widening in Business and Industrial Areas

A fundamental element in the whole problem of building lines demands consideration when the need arises for the widening of streets in business and industrial areas. Some abutters argue that it is the public that needs the wider street, and that the public should pay the bill, give the enhanced values to the abutters and be content if the latter pay a tax on a portion of these increased values. But let the public say that it can more easily solve its problem by diverting the traffic into other channels, and up goes a terrific howl from these same abutters.

In short, and to be perfectly frank about it, the abutters want constantly higher and higher buildings and wider and wider streets at the public expense, in order that the abutters may reap the benefit of ever-increasing land values and do an ever-increasing amount of business. There are certain disadvantages to increased land values which need to be recognized, and there is no advantage to the community in having all its business done on a small section of its surface. Undue land values are an undue tax on the people and on all business in the community. Other areas, too, have a right and should have a chance to benefit by such increased values as are not artificially forced. When a given area has reached the point of saturation, there should be decentralization, for convenience, for comfort, for safety, for health, for many reasons, any one of which is sufficient to justify decentralization. And the way to prevent undue congestion with all its hazards is to prevent it, not to wink at it and go on increasing it at the expense of the people in every respect, simply that the central few may reap ever-increasing profits. The community comfort and the community good are the matters to be kept in mind.

With these points disposed of, the course to pursue is at least to see that central district streets are wide enough to take care of

A Duty to Perform Now

In the life of the community, generations of people and of buildings come and go, but streets and roads go on forever. Streets and roads are the most rigidly fixed of all the features of a community. The brevity of human life tends by its very nature to increase the fixity of the street system, as well as its inadequacy, because of the tendency to care for the present only and let the future look out for itself. There is always the assumption that at a later time changes can be better afforded than at present. Experience shows the falsity of this assumption. The public official who has the qualities of the statesman sees that he has a duty to perform now in order that future generations may not arise to curse him for his selfishness or short-sightedness. It is therefore of the utmost importance that we consider carefully the location, grades, and widths of streets.

the traffic normally to be expected when all buildings are as high as the maximum allowed, or, if this can not be done, to reduce the maximum height to fit the streets as they are or as it is deemed wise to make them.

Main Thoroughfares

Then the main ways leading to other centers of the city or town or to other cities and towns are to be considered. If these ways are fairly wide, a building line of moderate depth will do. If the street is narrow, a deeper building line is desirable. But such ways should be carefully considered as to their direction, grade, and other elements important to such main ways. If direction, grade, and other features are not satisfactory, there is little good in planning for widening or expensive surfacing. This country is losing millions in money by work on streets which are not where they ought to be, and it is not merely the direct cost but the continuing cost of keeping steep and unduly crooked main ways in order and the cost in time and money to those who use such streets. Having settled that there is a reason for such a main way, and that its grades are right or can be made right, the point then to be decided is as to how far back to set the building lines.

There are additional reasons for building lines well set back from main thoroughfares. Such ways are for a considerable period of time lined with homes, and the greater distance is essential to the comfort of the inhabitants, through protection from the many hazards and annoyances of such ways. When such streets shift to business uses, the need still applies and the conditions will thus be constantly met. Should all the space between building frontages ever be needed for street uses, that time would probably arrive at about the time when the street was fully ripe for business development.

The use of building lines for securing a gradual setback of buildings on a street is the most economical method of widening, but it must be started in time if it is to produce results when they become imperatively needed. By this process building lines are established, and thereafter no new building may be erected except such as are set back to the established line. When an old building is torn down and a new one erected, the new one goes back to the line. Thus in a generation of buildings the whole alignment is changed.

Now is a particularly important time to use this method, and careful studies should be made as to all important places where it should be applied. This is an era of rebuilding in large areas in many of our cities. The older buildings are generally of wood, but the new ones are commonly of brick or some other type of material which makes their destruction more expensive than formerly, even if we leave out of consideration the usual increase in height and area of the newer buildings. These latter features make it fatal to wait till a street is lined with new buildings.

Street Planning for Residential Areas

With the advent of the automobile we are coming to see the whole question of city planning in a different light. Business ways and main thoroughfares should be wide, fairly straight, and of easy gradient. But it is no longer so of residential streets. The minute such a street leaves the main way to which it is tributary it should become so crooked and its destination so obscure that no automobilist who does not live on it will ever discover it, and, if he does, will never be tempted to use it, and certainly not for speeding. Danger to life and limb, noise, dust, and general traffic nuisances, qualities so strongly possessed by the genus automobile, are more and more forcing this point of view upon us everywhere. It is going to have a material effect upon the city planning of the future.

So residence streets will in many instances be more narrow. But that does not mean that the fronts of the homes should be closer together, gazing, unlovingly, into each other's eyes. It means that in residence areas there must be building lines and that they should be as far back as is economically feasible. This is what will give the opportunity for lawns, flowers, shrubs, and trees, what will make possible a desirable and perfectly functioning home district. That it may be practicable, building lines must be established to make the condition permanent and protect the area from the careless and inconsiderate citizen who wants his house projecting beyond that of his neighbor.

Thus there will be building lines in all kinds of districts, each worked out so as to best accomplish the purpose of the district and protect its proper functioning. And, as will be seen from what has gone before, such lines must be on every street except those few that were laid out as wide as is practicable and those in the central district where the buildings can go no higher and where

there is nothing to be accomplished by such lines. At present such places are rare because of the absurdly high limits we have set to the height of buildings.

One point should be kept in mind—the difference between building lines established in a business district, for widening now or at some future time, and lines established in residence districts for health, safety and general welfare. The former must be done under eminent domain with at least theoretical damages; the latter may be established under the police power, with no compensation involved, because the whole basis is different. But the attitude of the people and the courts is changing, for reasons some of which have been mentioned, and it is not at all unreasonable to expect that some time the whole may come under the general welfare clause and become a matter of public regulation, just as it is expected that the city plan may be laid down according to the needs and conditions and enforced in the interests of the community, under the police power with no question of damages involved.

Here enters the question of "public use," as applied to matters relating to eminent domain. Property may not be taken for public use without compensation, and no one desires that it should be so taken. But the establishment of building lines in residence districts is not a taking of the land between the street and the line as established. It leaves the land in the hands of the owner and for his use and enjoyment, providing only that he may not build upon it. This restriction placed by the public is not a taking for a public use, and the parties substantially benefiting are the owner and the neighboring owners, in varying degrees as the distance increases. The owner enjoys the same advantage from the lines set on the two lots which adjoin him, and in decreasing degree from the lines on other lots in the block and on the street.

The same idea may be applied in business districts. The developer in the first instance dedicated the streets, as he should. When the time comes that the owner needs a wider street so that the people may in increased number come to do business with him, he should probably be likewise held as in duty bound to provide such access. The argument that all the traffic does not use his place of business does not hold, since the man involved himself has the use of the streets and highways throughout the entire country, and not all of his travels are for the purpose of purchasing goods.

Building lines should be established before there is any building, and they should be of uniform depth for every block for considerable distances. This should include corner lots, in order to avoid bottle-necking every street at every street intersection. It doesn't follow that all building lines should have the same depth, nor does it follow that no one would set back beyond the minimum established. Variety will be secured according to the various tastes of the people going into the region, just as it has been secured in the past, but if there should be no variety for a considerable distance, it would not be as bad as a variety so great that it means chaos in appearance and renders any widening of the street forever impossible.

Corner Clearance

Another feature to be considered in this connection is corner clearance. This involves both traffic clearance and vision clearance. Generally fatal to both of these is the device too often used of requiring less of a setback on one side of a corner lot. It works all right for the main street, so far as general setback purposes are concerned, but, as we have seen, it does not work on cross-streets. And when we come to consider corner clearance, for either of the purposes mentioned, the scheme fails. Most problems of corner clearance involve a main way and a minor cross-street; at any rate they involve enough of such conditions to make it very unsafe to ignore the side street when establishing building lines. The building line is one of the best methods of providing for corner clearance needs. Here again, the way to provide corner clearance is to provide it. If you do not provide it, you do not have it. Its necessity since the coming of the automobile is obvious. The argument that it penalizes the man with a corner lot does not hold in fact, and it does not need to occur at all if the simple device is used of giving him the usual advantage of a more shallow rear yard. This has been done in many laws having to do with housing, and may continue to be done with no disadvantage; in fact, with decided advantage, when we consider the rear yard reduction as a compensation for the proper openings at the intersection of streets.

In regard to corner clearance Philip Nichols has said that "the only way to meet this situation is not to wait till the horse is stolen before locking the door: in other words, to establish the building lines before any one has any definite plan of constructing store prop-

erty at the corner." By doing this, the expense, if any, may be kept within a reasonable range.

EDITORIAL NOTE.—Edward T. Hartman, author of the foregoing article, has included in Bulletin No. 17 of the Massachusetts Federation of Planning Boards, a set of forms used in Winchester, Mass., in the establishment of building lines and the widening of streets, together with other valuable information as to procedure under the Massachusetts laws. A copy of this bulletin can be secured on application to Mr. Hartman at 37 State House, Boston.

Traffic Regulation and Direction Signs

Recommended by the International Police Conference

THE photographs here reproduced are from a set of models of traffic regulation and direction signs prepared by the Police Department of the city of New York and displayed at the International Police Conference, May 12-16. The adoption of arrow-shaped signs as a uniform method of road marking was recommended by the Traffic Committee of the Conference; the lettering to be black on a white background, and no more words to be used than absolutely necessary.

In an address which preceded the presentation of the report, the committee's chairman, William A. Coleman, Deputy Chief Inspector of Police of New York City, stated that at the 1923 session of the International Police Conference recommendations had been adopted permitting the use of an arrow on a rectangular or other shaped board, but that in his opinion the best results would be obtained by the use of signs cut to the arrow shape; and he added:

"I have found from personal observation that disc or other shaped signs with an arrow painted thereon, or on which instructions are printed, are practically useless; they cannot be read at a distance and are absolutely useless at night, whereas the outline of the arrow stands out, is quickly recognized and there is no mistaking its meaning.

"Within the next few weeks all disc signs will be removed from the streets of New York City and replaced with the arrow-shaped sign, which is best adapted for directional purposes. For instance, placed on electric light poles in one-way streets, it cannot have any other meaning than that traffic should move in the direction of the arrow, and no further instructions are necessary.

"At detours, pointed right or left, it plainly indicates which way to turn.

"An arrow with a diamond-shaped plate means two things—that commercial traffic and heavy trucks are prohibited from using that thoroughfare.

"An arrow pointed downward means "Stop."

"An arrow with a circular disc, pointed upward, placed in the vicinity of schools, churches, courts, hospitals, and in congested streets, means "Caution; drive slowly."

"Then we have the danger signs for railroad crossings, dangerous crossings, dangerous hills, sharp curve to right or left.

"At present we are continuing to print brief instructions on the arrows, but it is believed that after a short time even this will be unnecessary.

"The type of sign used should be reduced to the smallest possible number, so that their meaning may be more easily understood and remembered. While there were twelve different types of arrow signs adopted at the Conference, there are really only two or three of the number of arrows mentioned that will be in daily use in this city with which it will be necessary for the public to familiarize themselves. The one-way street sign is so well known that there is no need of explanation, and so with the "Keep left" and "right" sign. The other signs may be unfamiliar for a while, but they will be quickly understood.

"The use of the arrow sign should become universal, so that no matter in what part of the world a motorist may travel, the directional sign will have the same meaning to him. This would eliminate a lot of unnecessary confusion now encountered when traveling from one state to another, or from one country to another. It will be a great factor in reducing accidents and insuring safety for pedestrians.

Colors for Traffic Light Control Systems

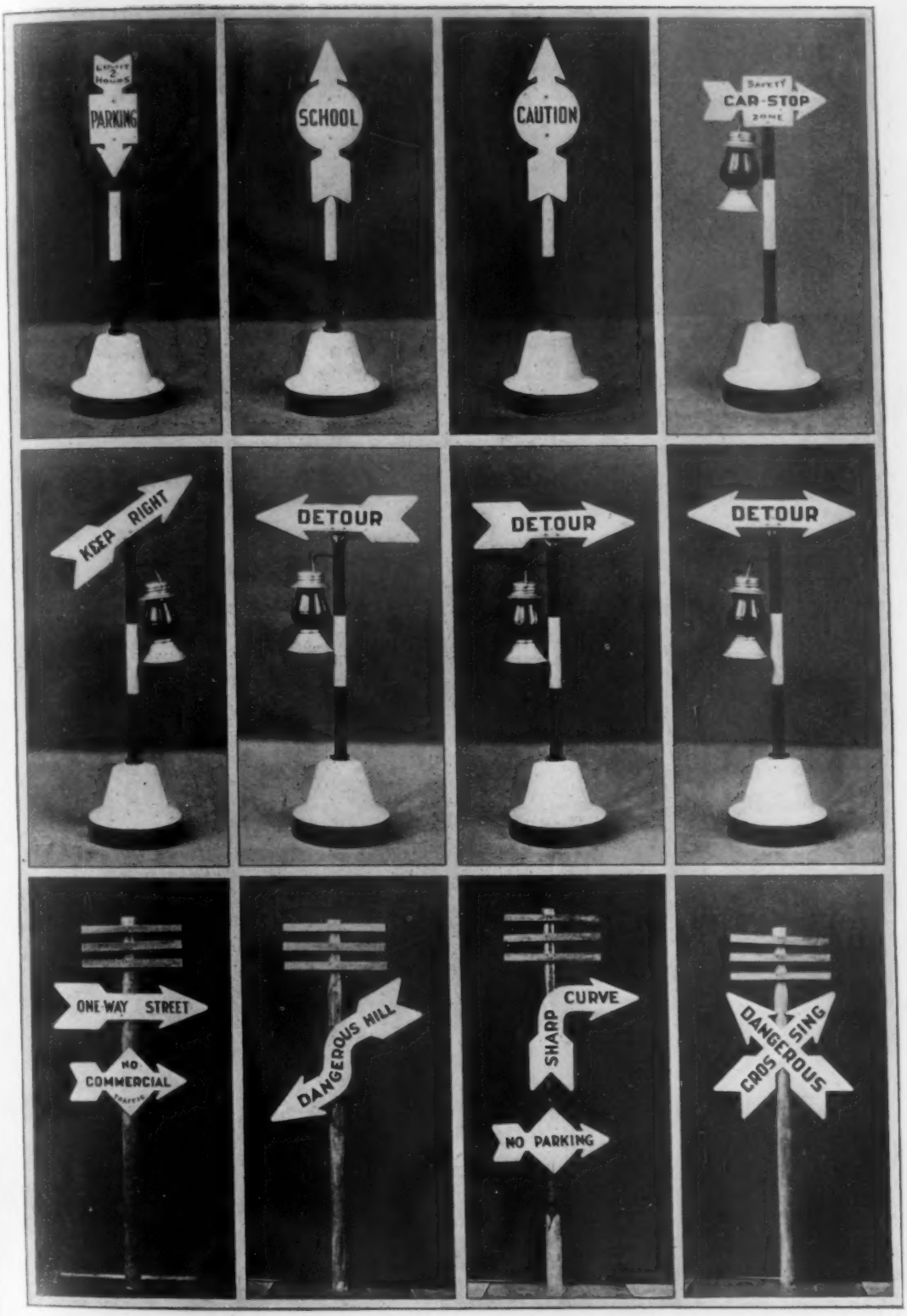
"This also applies to the use of lights in the control of traffic. Since the traffic light control system was adopted in New York City we have used the following lights in the control of traffic:

"Yellow light—north- and south-bound traffic moves.

"Red light—moving traffic stops.

"Green light—east- and west-bound traffic moves.

"The use of these lights caused some confusion and was the subject of much criticism. This matter was the subject of much study on the part of those concerned, and it was finally decided to adopt a new system of light control, that is, red for "Stop," and green for "Go." This system was put into effect on April 27, 1925, and has met with universal approval. I recommend that this system be adopted as the standard traffic light control system throughout the United States and other countries where a traffic light control system is now in operation or about to be installed."



MODELS SHOWING SHAPES AND WORDING OF ARROW SIGNS RECOMMENDED BY THE TRAFFIC COMMITTEE OF THE INTERNATIONAL POLICE CONFERENCE

Forward Steps in Municipal Affairs

How a Village Has Improved Its Police and Fire Protection

MEDINA, N. Y.—A study of the records of the Police and Fire Departments of the village of Medina for the last few years, as compared with those of, say, ten or twelve years ago, shows such a marked decrease in the yearly total of arrests made by the Police Department, and in the reported annual fire loss for the community, that some details of the present policies of these two departments will no doubt be of interest.

This village, with a population of about 6,000, is located on one of the main routes between Rochester and Niagara Falls, and is consequently faced with the problem of handling a constant stream of tourist traffic during the greater part of the year. If it were the policy of the Chief of Police to arrest every motorist guilty of a slight violation of the local traffic rules, our present police force of six men would have to be enlarged considerably. A much better plan, however—that of offering constructive criticism in a friendly spirit—has been adopted. It is found that educating the stranger as to the traffic laws of this village and impressing him with the absolute necessity for their enforcement, rather than imposing fines at every opportunity, brings us much nearer to a solution of the problem. And the whole community reaps the benefits of a reputation among tourists of being a friendly town. The Department is equipped with two motorcycles, and it is Chief Brainard's policy that both the machine and the officer shall always be in full view of the motorist. The practice of hiding behind board fences or buildings, awaiting a chance to come upon a driver unawares, is not tolerated.

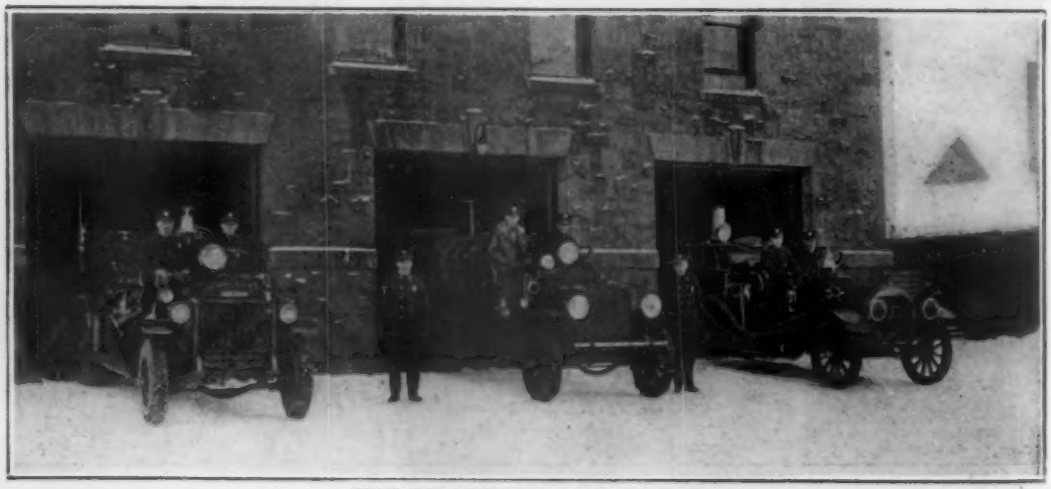
During the day, the Chief and two men are on duty, and the remaining three on the force take the night watch. With this small force the village is adequately policed, and no detectives or merchant police are needed.

The remarkable decrease in the fire loss for the community during recent years is mainly attributed by Fire Chief Weller to the greater efficiency of the present paid Fire Department, as compared with the old volunteer system abandoned twelve years ago. For the last year under the volunteer system the fire loss for Medina was $120,000. Since that time there has been an average annual fire loss of $32,682, and last year it was only $7,500.

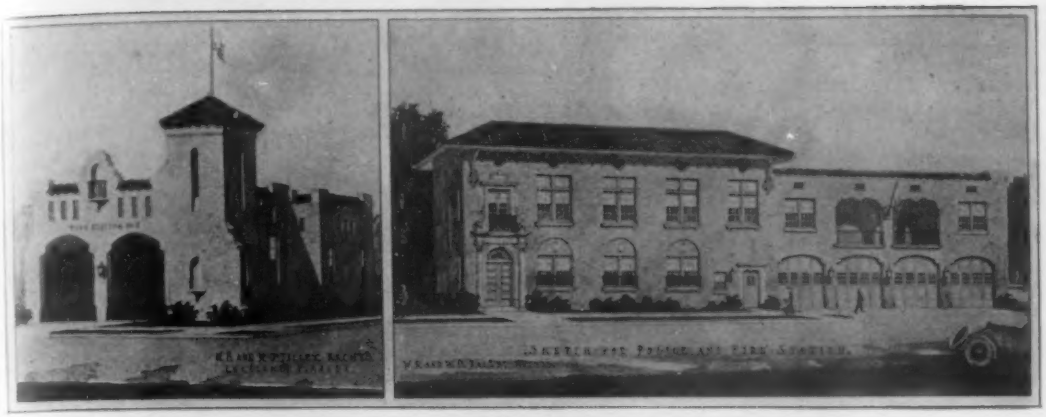
The first paid firemen were employed as drivers in 1910, but the several volunteer companies were not disbanded until two years later, when sleeping quarters were provided for the paid men. In 1914 the staff was increased to four—a Chief, an Assistant Chief, and two drivers. The apparatus at that time consisted of one team of horses and a hose wagon. Three years later a Waterous 600-gallon pumping-engine was purchased, and this piece of apparatus is still in active service and in fine shape. Since then an American-La-France-built Brockway hook and ladder truck and a Prospect-built Brockway 350-gallon pumper have been added to the equipment, and the personnel of the Department has been increased to eight full-paid men and four call-men.

Two other important factors in the reduction of fire loss in Medina have been the installation of the Gamewell fire-alarm system, which makes it possible for the apparatus to be on the scene of the fire in the minimum amount of time; and the decrease of fire hazards through monthly building inspections made by uniformed members of the Department under the direction of a superior officer.

J. ALLEN AYRAULT,
Village Trustee.



FIRE DEPARTMENT, MEDINA, N. Y.
New motor apparatus, a fire-alarm system, and monthly building inspection have enabled this department to reduce fire loss



SKETCHES FOR ONE OF THE NEW FIRE STATIONS IN LAKELAND, FLA., AND THE CENTRAL POLICE AND FIRE STATION

New Police and Fire Stations

LAKELAND, FLA.—A distinct step forward for this municipality has been the erection of a new central police and fire station, and two other new fire stations for the north and south sides of the city. The attractive and somewhat unique design of these buildings, which are all of hollow tile and stucco construction, may be seen from the accompanying photographs of the central and north side stations. The latter station is identical as to design and specifications with the new south side station.

On the first floor of the central police and fire station are located a police office, cell rooms, the office of the Fire Chief, and space for four fire trucks. The second floor contains a police court room, the Police Chief's office, cell rooms, sleeping quarters, toilets, showers and lockers for the firemen. This building was erected at a cost of $39,625, exclusive of the cell work. The contract for this additional work has not yet been let, but it is estimated that it will amount to about $15,000.

In each of the other two stations, space is provided for two fire trucks, and sleeping quarters, toilets, showers and lockers for the firemen. These two buildings together cost $14,920.

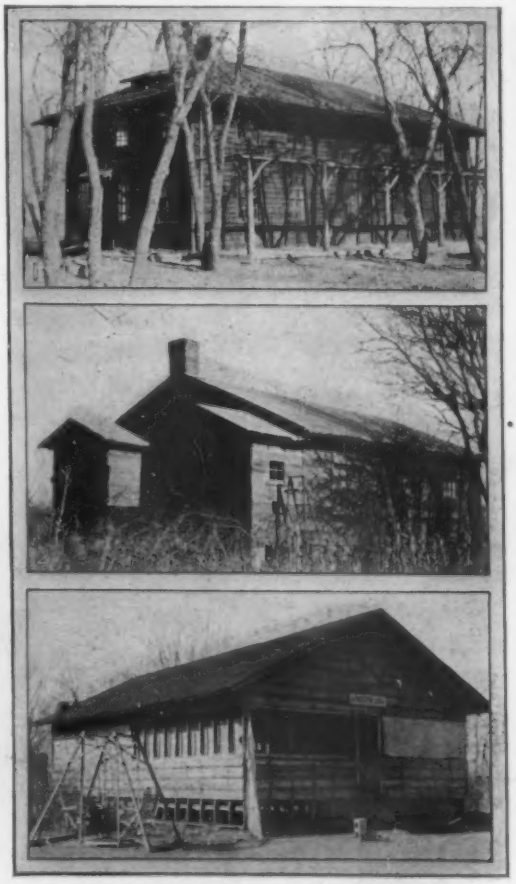
D. HODSON LEWIS,
Secretary, Lakeland Chamber of Commerce.

Recreation Cabins for Boys and Girls

HUTCHINSON, KANS.—While the problem of giving boys and girls the benefits of fresh air and outdoor play is thought of by many people as one that confronts only the largest centers of population, the question is in reality one that should be given consideration by even the smallest of our cities. For, although it is true that the open country lies but a few miles from the center of many small communities, it is equally true that without the guidance of trained play leaders, and with no spot set aside for their particular use, the young people lose a great deal of what the outdoors has to offer.

In Hutchinson, which has a population of over 23,000, some phases of this problem have been handled in an interesting way through the organized groups of Boy Scouts, Girl Scouts, and the members of the Y. W. C. A.

A number of Boy Scouts troups have for some years been active in Hutchinson, learning the principles of scoutcraft under the direction of a full-time executive. The troups could meet either at the City Hall, in a church hall, in the Cham-



RECREATION CABINS, HUTCHINSON, KANS.
1. Quivera Lodge, for Boy Scouts
2. Fairchild Cabin, for Girl Scouts
3. Lingernook, Y. W. C. A. cabin

ber of Commerce rooms, or at some similar place, but a rendezvous of their own, where they might do in boyish ways the things that boys like to do, was lacking. To one of our scoutmasters belongs the credit of launching a campaign to give the boys what they needed—a cabin in the outdoors. He first appealed to the Hutchinson Cooperative Club, of which he was Secretary, and so completely won its cooperation that the Club assumed the responsibility of seeing that a cabin was built. Quivera Lodge stands as a result of their efforts. It is a well-built, commodious structure, completed at a cost of about $5,000, and is situated on an island in the Arkansas River, within the confines of the city's one large municipal park. The city's contribution to the project was the building of a suspension foot-bridge over a branch of the river, affording easy access to the island.

The Girl Scouts, too, had visions of a play place in the open, and the cabin which they now enjoy is an example of what can be accomplished when real team-work is applied. They did not solicit funds for their project, but earned the money by their own efforts. For practically two years Girl Scouts were on hand at every community function, selling their stock-in-trade of candy, ice cream, etc. The fund grew steadily, until the building of a cabin was realized. A third cabin, "Lingernook," was erected for the Y. W. C. A. The members themselves earned the price of the lumber, and the actual building was done by members of the men's Bible classes in the city. Both of these cabins stand on private grounds, in secluded spots on a creek bank, within hiking distance of the city but well away from all centers of business activity.

In favorable weather few nights pass when one or all of these three cabins are not occupied by happy groups of youngsters seeking health and recreation under the guidance of trained leaders.

—C. A. LOVELL.

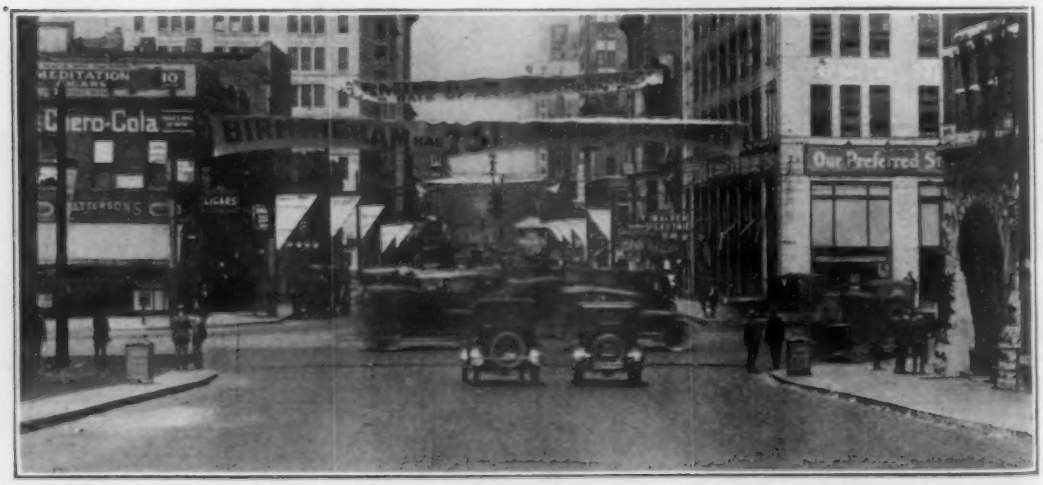
"Know Birmingham"

BIRMINGHAM, ALA.—In a "Know Birmingham" week conducted recently by the Birmingham Real Estate Board, every available medium of publicity was employed to educate the people of Birmingham as to the greatness of their city.

In the last forty years this city has grown so rapidly that it has been impossible for it to assimilate its ever-increasing population. By far the greater majority of the more recent newcomers were merely "in" and not "of" Birmingham, and their spirit in many cases seeemed to be to assure their own success and to let the city worry along as best it could. This situation, which presents many difficulties for real estate men and others who are aiming to build for permanence, is one that will be found in all rapidly-growing communities unless it is constantly combated.

The suggestion that a "Know Birmingham" educational campaign be held originated with Clyde H. Nelson, President of the Real Estate Board, and when it was put before the Board, the members immediately rallied to the support of the movement. Within five minutes after the motion to put on this campaign had been unanimously carried, those present had pledged $2,000 to defray such necessary expenses as the establishment of an executive office for the coordination of campaign efforts, the employment of a campaign manager, etc.

One of the most interesting features of the campaign, particularly to those who may be contemplating a similar effort elsewhere, was the efficient and inexpensive way in which the publicity was obtained. The problem of providing decorations for the streets of the city was one of the first to be faced by the realtors, and it was decided to handle it in the following way: The members of the Board were divided into committees, and to each committee was assigned a list of manufacturers grouped according to location. The committees called on these men to make them acquainted with the "Know Birmingham" idea and to suggest that they cooperate by purchasing telegraph pole posters bearing the slogan "Know Birmingham and Tell the World," the name of the manufacturer contributing the sign, and some interesting facts about his particular business. The manufacturer paid the sign painter direct for his work of painting, putting up and taking down



ONE OF THE STREETS IN BIRMINGHAM, SHOWING THE TELEGRAPH POLE POSTERS AND THE STREET STREAMERS AS THEY LOOKED DURING "KNOW BIRMINGHAM WEEK"

the signs. Two hundred and forty of these signs were contributed, and, in addition, the luncheon clubs and a few of our business men donated a number of 50-foot banners bearing the campaign slogan to be hung across the principal business streets. These signs and banners made a most attractive decorative scheme and afforded excellent publicity.

The pupils in the elementary and high schools were furnished with appropriate reading matter, which was made the basis of a special study course during the campaign week, and later, essays were written on the subject of Birmingham, incorporating the new knowledge acquired through the campaign. Prominent business men and realtors made talks before the children in the elementary schools, and other speakers gave three-minute addresses in theaters and motion-picture houses. On Sunday of that week the subject of the campaign was presented by the preachers in all the churches in the city. Manufacturers and merchants worked together to place displays of goods manufactured in Birmingham in the windows of the down-town stores; placards were placed on all taxicabs and street cars; leaflets were dropped from an airplane; slides telling important facts about the city were used in the motion-picture theaters, and five hundred rubber stamps bearing the slogan were distributed to business houses and offices for use in stamping letters, railroad tickets, baggage checks, etc. The local newspapers published special sections of interesting news about Birmingham in their Sunday editions, and articles on Birmingham business and industry appeared in all magazines published in this city, the space being donated by the publishers.

Through this wide variety of publicity it was possible to reach people of all classes, and the expenses involved were contributed from so many sources that no great burden was imposed upon any individual or organization.

—BIRMINGHAM REAL ESTATE BOARD.

Property Owners in Wellsburg Can Secure Paving Through Petition

WELLSBURG, W. VA.—The brick paving of Wellsburg, laid some time in the 80's, stood up well for a good many years. Twice it has been completely submerged beneath the water of the Ohio River, and for the last five years it has been subject to the wear from exceptionally heavy trucks loaded with coal. Gradually the condition of these streets became so serious that the question of new paving could be no longer postponed.

But the financing of the proposition was a grave problem. It was recognized that a bond issue that the public would approve would not produce enough revenue, and that the property valuation was not high enough to enable the city to raise the needed funds through taxation.

The City Council proposed the changing of the city charter so that property owners on improved streets should pay in proportion to their foot-frontage. Sponsored by Mayor William T. McCreary, this plan was presented to a citizens' meeting held in the Court House, and met with a violent obstructionist policy.

Resenting this attitude, the Kiwanis Club appointed a committee to draft two plans by which street paving could be accomplished. The committee considered the program as outlined by the City Council and outlined another program, similar in many respects to the first, but containing the clause, "Council can order paving only when a majority of property owners in any one square petition for paving." Voting on the relative merits of these two plans, the Kiwanis membership felt that if the property owners were given the opportunity to ask for paving, a majority of them would do so, being willing to pay for it, but that they would not be willing to provide the Council with the authority to order the work done without consulting the property owners.

Adopting the plan providing for the right of petition, the Kiwanis Club took steps to place the matter before the people at a municipal election on April 14. The proposition was carried, and the next day a bill was introduced in the West Virginia Legislature calling for the required charter changes. It encountered no opposition and was passed by both House and Senate on April 22. It has since been signed by the Governor, becoming effective at passage.

GEORGE S. LARRIMORE,
Managing Editor, Wellsburg *Daily Herald*.

IMPROVEMENTS

A Rippling Rhyme

By Walt Mason

They mixed cement and sand and stones, and paved the street before my lot; it set me back a thousand bones, but didn't make me peeved or hot. I'm always glad to dig up wealth to help our growing town along, to stimulate commercial health, and show the world we're going strong. The street when paved was smooth and fine, and on it traveled cars and trucks; and a contented heart was mine, although I paid a thousand bucks. But scarcely was the pavement hard befor there came a gashouse crew, who smashed and broke it, yard on yard, supplanting rusty pipes with new. And when the gas gang moved away, and left a bumpy street behind, the water bureau sent a dray with workmen polished and refined; they ripped the pavement all apart, installing couplings made of brass; I wrung my hands and broke my heart, but all my grief cut little grass. The water workers pulled their freight and left the pavement upside down; the hills and furrows, wide and great, broke all the auto springs in town. And then the phone department came, its merry men just swarmed around, and played the digging, blasting game, to put their cables underground. The street is now a ghastly wreck, from which much comfort we had hoped; each day some chuffer breaks his neck, some walker's spine is telescoped. Thus goes the business of the town, and no one ever looks ahead and puts the pipes and cables down before the rich cement is spread.

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How Shall the Planned Region Be Governed?

By Thomas H. Reed

Professor of Government, University of Michigan

OUR need is a new method. But what is that method to be? A political scientist is on solid ground when he points out the defects only too evident in tried devices. He imperils his reputation when he suggests a new device. With diffidence, however, and in the hope that my proposal may at least serve as a starting point for more constructive thought, I propose the creation of a new unit of local government — the *Region*. Its size should vary with conditions. States predominantly rural might well get along without it altogether. It should be centered usually upon some relatively large urban community, and include the territory socially and economically dependent on it, although I would by no means bar such units as the "Niagara Frontier." Regard should be had at the same time to historic origins and sentimental ties. My proposition has nothing in common with the movement for "Regionalisme" in France nor with the devolution of Parliamentary functions to regional goverments, as has sometimes been urged in England. G. D. H. Cole, in his "Future of Local Government," has suggested something of the thought I have in mind, but on a grandiose scale, and with communistic implications which I would emphatically repudiate. The areas I would establish are smaller, more numerous, and more subject to variation than are his. I can see no reason why small Regions should not center on Albany, Syracuse, and Rochester as well as large ones on New York and Chicago.

My suggestion of the Region is based upon the commonly neglected fact that the question of metropolitan areas is curiously interrelated with that of efficient areas for rural local government. The cost of the services expected of a rural government has in recent years mounted with extraordinary rapidity. Highways, which in these days pop first into the mind in this connection, are in reality but one item in the swelling total. These increasing costs are, as is well known, wiping out by inexorable economic pressure the small units of rural local government. Parishes, rural communes, towns, and townships are doomed by their financial incapacity. Even the larger areas, such as our American counties, are often unable to meet the demands upon them. For years our municipal reformers, their thought centered on urban needs, have been crying "city and county separation." They based their arguments on English practice. For nearly a century it has been a principle of English local government policy to make every city of 50,000 a county-borough; in other words, to separate it, governmentally, from the rural area. A like principle at the same time decreed that all the built-up area around a borough should as rapidly as possible—excep-

The Government of Metropolitan Areas

"Plans must not only be made but executed. Great as are the difficulties in the way of carrying out a plan which affects but one city, they are as nothing to those which dog the path of the regional plan of a metropolis. It is proper, therefore, that we should this afternoon consider the matter not only of organization for metropolitan plan making, but of the organization of the metropolis for plan execution. Consistent and comprehensive results cannot ordinarily be expected from the mere voluntary cooperation of the authorities concerned.

"The objects of metropolitan organization are: first, to secure the execution of a uniform policy or plan with regard to that group of services properly supplied by local rather than by state or national enterprise and yet of interest to the whole metropolis; and, second, to achieve an equitable adjustment of financial burdens between the various portions of the metropolitan community."

The foregoing quotations are from the opening paragraphs of an address on "The Government of Metropolitan Areas," at the recent International Town, City and Regional Planning Conference in New York, the concluding portions of which comprise the accompanying article. In the intervening sections of his paper, Prof. Reed outlined some of the attempts already made to solve the metropolitan problem, none of which has satisfactorily solved it.

tion made of London—be included in the borough. These time-honored practices have suffered a check, for under their operation the population and tax-paying capacity of the counties were melting away. We have perhaps been fortunate that our cry for city-county separation from the rural areas around them is only robbing rural Peter to pay urban Paul.

From this dilemma there are only two avenues of escape: first, state subsidies to rural local government, with accompanying state control; second, the creation of large areas of local government centering upon and including the cities, i.e., Regions.

The Proposed Regional Unit

Accepting, for the moment at least, the latter alternative, we have a unit capable of handling:

1. Planning, including zoning and the preservation of suitable forest and shore reservations;
2. Transportation, including street railways, buses and rapid transit lines;
3. Traffic, including highway construction and maintenance;
4. Water supply and electric energy;
5. Drainage;
6. Certain aspects of police, health and charity administration.

Such a unit can be effectively governed by a council, say of nine, elected at large by proportional representation, thus minimizing the evil of multiplied local elections. The financial burdens of the Region can be equitably distributed by the creation of special assessment districts for such small part of its service as is not of direct benefit to the whole Region. A regional system will not entirely obviate the necessity of state contributions as a means of equalizing local burdens in such matters as education and highway construction. The Region, however, will be financially competent and will, by the performance of the functions entrusted to it, give ample relief to the overburdened rural treasuries. Within the Region the relations of city and county can be readjusted without hardship.

Perhaps of equal importance to the possibility of successful operation is the fact that the creation of the Region will not arouse the bitter popular opposition which meets every proposal for city growth by annexation. In the first place, it is not a means to the aggrandizement of any city. If, for example, a region were created in the Hudson-Mohawk valleys, centering on Albany, it would not change the census standing of Albany, Troy, Schenectady, or any other city. It would affect the existence, dignity, and essential independence of none of the existing units of government. The functions entrusted to it would be strictly limited and would leave the lesser units a full complement of powers and duties. They would not be reduced to the unhappy state of London metropolitan boroughs, certainly not to mere election districts like the boroughs of New York. What is proposed is a uniform system applicable throughout a whole state—a systematic grouping of communities with common interests. The fact that it would relieve the financial difficulties of rural areas and small cities would naturally tend to reconcile them to the surrender of a few functions to the Region. I make no promises—no one dares promise what the popular response will be to any suggestion—but I hold out these reasonable hopes.

Governing Is More Difficult Than Planning

The foundation of regional government is being laid, unwittingly almost, by the city planners. They are daily poularizing the idea of the Region. Prophets of the new and better day, they have "cast off their moorings from the habitable past" and set forth to chart the course of progress. The alluring idea of the regional plan is already accepted by the enlightened and imaginative. The time is coming, however, when you must take deliberate thought of regional government. For without regional government the fabric of your dreams will fray out to tattered fragments.

Governing is a matter of infinitely more difficulty, not intellectually, but humanly, than planning. Regional planning encounters no more opposition than the propositions of speculative philosophy. Those who understand approve, and those who do not understand remain indifferent. The proposition of regional government, however, at once arouses antagonisms. It is a new political idea and many, conservatives and radicals alike, are suspicious of new political ideas. It means the breaking up of vested political interests —some readjustment in party activity, some pruning of the tree of patronage. You will have beautiful regional plans on paper long before you have regional organization fit to carry them out.

The conclusion is inescapable. If it is worth while to plan for streets and parks and terminals, it is worth while to plan for institutions of government. It is the way of specialists to take for granted everything outside

their specialty. It will not do, however, to assume that arterial highways may be planned but that government just happens. The one requires and deserves planning as much as the other. Two great mementos the civilization of each age has left to its successors—its structures and its institutions. If there is any difference in the permanence of these memorials, it is to the advantage of institutions. Men will be reading the Code of Justinian long after the last three-cornered brick has crumbled from the Pantheon. Let us plan our physical surroundings and our institutions so that they may live on worthily together.

A Regional Plan for the San Francisco Bay Counties

By Russell Van Nest Black
Planning Engineer

BY topography, natural resource, and present development, the nine counties touching upon San Francisco Bay form a clearly defined economic unit. Valleys tributary to the bay area feel out among the low mountains of the Coast Range like the fingers from the palm of a hand to terminate within a one-day trading or commuting radius of San Francisco and the East Bay cities. These tributary valleys and their watersheds are now being brought under study by the Regional Plan Association of San Francisco Bay Counties.

The region tentatively under consideration extends approximately 50 miles south, 50 miles north, and 30 miles east of San Francisco. It is, roughly, 4,000 square miles in area, has a population of about 1,500,000 people and includes 58 incorporated municipalities. It is comparatively virgin territory, with only a small proportion of its area intensively developed. As a regional community it is very young, offering almost unequaled opportunity for advantageous planning in advance of further growth.

Physically, the area is broken by ranges of hills and the arms of the bay. There are districts and sub-districts within the primary region, with their respective local problems, which may or may not be given intensive study by the central association. One of the sub-districts, known as the Peninsula, extending from San Francisco southward to San José, a distance of 50 miles, is splendidly adaptable to the practical application of one of the most advanced regional planning theories—that of distributing small urban units, separated by agricultural or other open spaces, along a super-transportation line leadng to the central city. The strip of land capable of intensive development on this peninsula is narrow, fertile, and broken at intervals by low hills, with the backbone transportation line already fairly well established.

The Regional Plannng Association has been created to promote the planning interests of this promising region. Its function will be to coordinate the planning efforts of the several cities and counties of the district and to develop a comprehensive plan for the guidance of the growth of the entire area. The Association is an unofficial body, a group of public-spirited citizens, civic organizations, cities, and counties, united for the single purpose of making and promoting a plan for the San Francisco Bay counties, and financed entirely by membership fees and contributions. It is the outgrowth of many months of investigation made by a special committee of the Commonwealth Club of California, with headquarters in San Francisco. The building of a strong organization with a large membership is now in process. It is expected to begin a comprehensive survey in the near future, to be followed by planning studies, both to be under the guidance of a group of capable planners and engineers.

Among the problems to be met are those of:

1. A unified plan for port and harbor development
2. A coordinated system of highways and scenic boulevards and bridges
3. Rapid-transit connections between all parts of the district with special attention to commuting facilities
4. Freight transfer and air, rail, and motor transportation and terminals
5. The acquisition and development of recrea-

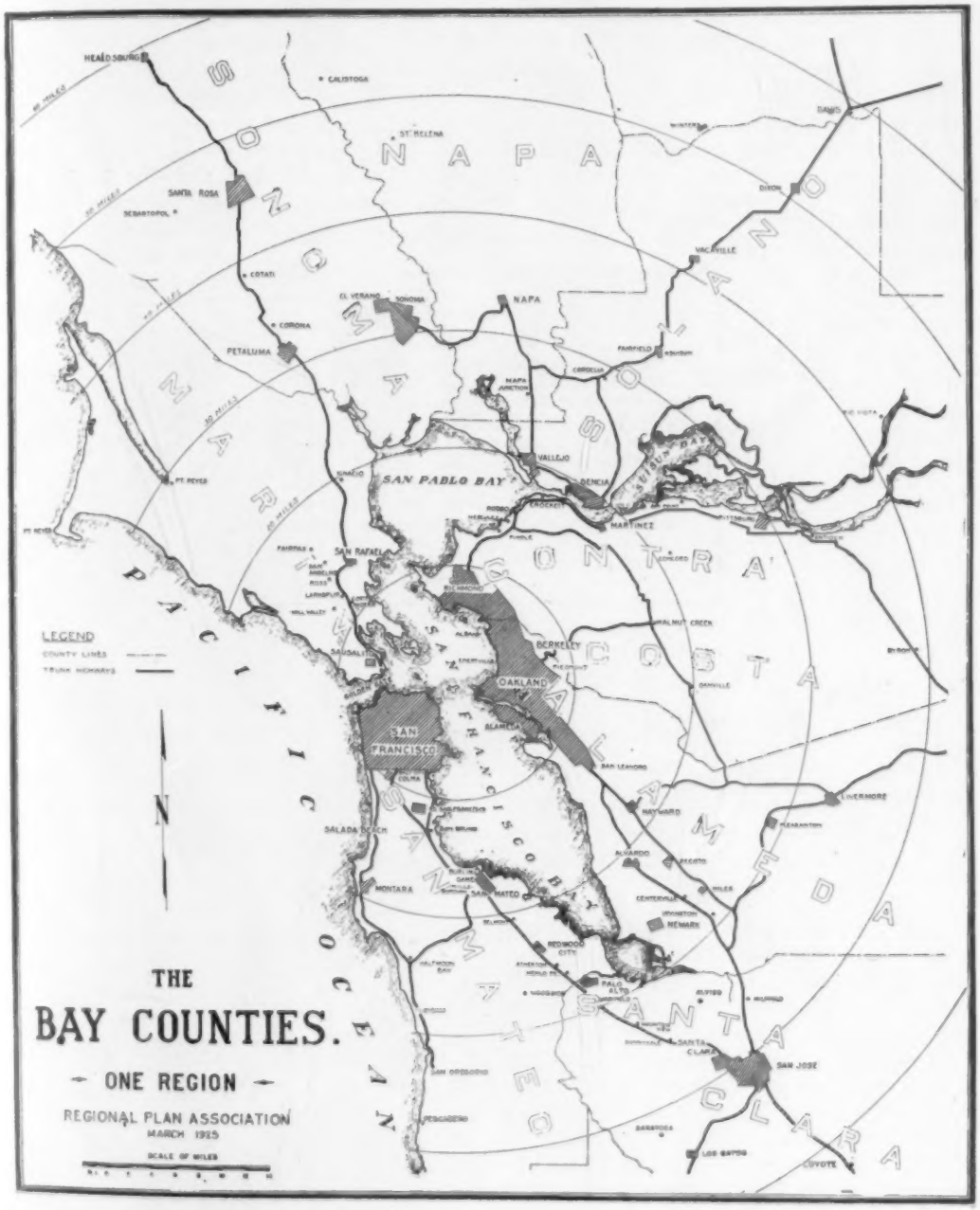
tional areas and large park reservations

6. The conservation and development of natural resources.

7. Removal of the growing menace of pollution of the bay by sewage and waste; and flood control, and water-supply

8. Regional zoning for the determination of the areas best suited to home-building, to industry, and to agriculture, and to insure a convenient and proper relation between home areas and industrial sites

It is tentatively planned to conduct the work through a small executive committee acting as a planning board and working in conjunction with a large board of directors representative of the several sub-districts, counties, and cities. The work of the central boards will be tied into the region through local committees. By this means and large publicity and educational work it is hoped to put the studies of the Association into effective operation.



The Care of Bridge Floors

By Clyde Piper

County Highway Superintendent, Fayette County, Ind.

THE steel bridges in Fayette County, Ind., are of various kinds, with the usual floor construction of plank, creosoted wood block, and cement, all of which have their limitations and disadvantages. These bridges are to-day carrying loads that the designer and builder never dreamed could be carried on the county highways. The White Water and its tributaries traverse Fayette County in such a way that there is hardly a main or secondary road without a steel bridge of some kind. Originally, the floors of these bridges were nearly all 3-inch planks laid crosswise. Under present traffic, this type of construction subjects the bridge to very heavy destructive vibration, and the floor plank to a heavy impact of wheels which results in broken boards. Bridges have also been floored with a lengthwise floor, 10 to 12 feet wide with boards 2 inches thick. This strengthens the floor, eliminates vibration, noise, and broken boards. These bridges were floored originally with native oak, which is practically out of the local market. At present many of them have a second top floor which has lengthened the life of the first floor by several years.

Conditions Have Changed Materially

Highway officials face an entirely different problem to-day in considering bridge floors, from the one they faced a few years ago. With increased traffic and heavy motor trucks traveling at a very high speed compared with the traffic that the bridge designer and builder knew when the bridges were built, conditions are produced in which the floors, as well as the structures, are overtaxed and destroyed.

The creosoted wood block floor is susceptible to warping, and then heaving follows. We have one block floor that has been in use for many years. This floor was taken up and relaid several years ago. Some of the blocks were deteriorating and were of an odd shape caused by the pressure of heaving, until it was impossible to hold them down with any treatment that we used. We used a cement mixer and cold mixed asphalt with washed pebbles and sand, running them through the mixer until the pebbles were thoroughly coated, and a fairly wet mix. This was spread on the floor to 1½ inches in thickness, leveled down smooth and covered with sand to take care of any surplus asphalt in the mix. This job did not add much dead weight to the floor and so far has been very satisfactory. We have also had good success with other block floors by treating them the second year after they were laid, with the used oil from the motor trucks. The floor is swept with fiber push brooms first and then with a heavy stable broom, removing as much dirt and dust as possible, and scraping off any substance that adheres to the blocks. This is followed with sprinkling-cans and fiber brooms, brushing the oil until the floor is thoroughly covered.

We have also used cold mix asphalt on the block floors. **All dust and dirt is first removed**, using scrapers where necessary. These floors must be cleaned thoroughly, as the success of the job depends on their cleanliness. When asphalt strikes dust, it will not adhere to anything, while oil will penetrate a little dust. The floor being cleaned, the asphalt is poured on and brushed until the floor is fully coated. Then, dry sand is sprinkled over the floor. The sand coat follows closely after the brush. This type of treatment has resulted in a very satisfactory job, and either of these treatments gives a covering for the floor which is a preservative and is water-proof.

Cement floors should be watched closely for checks or cracks. If any appear, they should be taken care of immediately. Any depressions should be filled with tar or asphalt, bringing them up to the level of the floor.

Several of the old plank floors have been replaced with a creosoted oak, made up of 2 x 4's set on edge and fastened together with three angle-bar tie-rods, in slabs 1 foot in width. This type of floor makes a self-cleaning surface and is free from swelling or bulging. Some that have been laid in Fayette County were bolted to the channel-irons through the end of each plank or slab. After some were laid this way, the method was changed and a 3 x 4-inch creosoted piece was laid at each end, using only three bolts to the

piece, which speeds up the laying of the floor and also cuts the cost. These floors should be covered with asphalt, preferably the cold mix, brushed in with a broom and then sanded. They are laid quickly without skilled labor and do not make it necessary to close the bridge except for a very short period. They carry very little dead weight in proportion to their strength.

Rolled iron plates which are made of different widths should be mentioned in the care of bridge floors, as they eliminate vibration and do away with wear on the floor, besides serving as a traffic guide. These plates, which have non-skid markings, prevent slipping and make a fine driveway.

A bridge floor, in order to be able to give all service possible, should be level with the road or approach, and kept smooth to eliminate all vibration possible, and any floors that are improved should be given a coating of some waterproofing material, which preserves them and makes it possible for them to deliver the most service in proportion to the investment with a minimum vibration.

ACKNOWLEDGMENT.—From a paper read before the Eleventh Annual Road School, at Purdue University.

Building the Stone Roads of Monroe County, Indiana

By Professor U. S. Hanna
Indiana University, Bloomington, Ind.

MONROE COUNTY is about 60 miles southwest of Indianapolis and is comprised of twelve civil townships. Owing to the generally rough and rolling character of the land of the county, the roads do not follow the county lines, but follow ridges and valleys instead. About one-third of the land is very good for farming purposes, one-third is only fairly good for tilling and pasturing, and the remaining third is about as poor as any land in the state.

Some of the first pike roads in Monroe County were built at a cost of $850 to $1,000 per mile. Of course, they had fords then, in place of bridges and culverts. Most of these roads have been built two or three times since. The average cost of the 400 miles of roads at present in existence, taking into consideration the fact that many miles have been built two or three times, is probably close to $5,000 per mile, making the total cost about $2,000,000. Another million dollars spent for new roads spread out over a period of twenty years would solve the problem of the needed roads in this county. When it is possible to settle down to maintenance and occasional rebuilding of old roads with new and improved materials, the heaviest burden of road building will begin to lighten.

The property within the corporate limits of the city of Bloomington carries over half the cost of new roads and maintenance. The citizens generally are strongly in favor of going ahead with the program of connecting the improved county roads with the improved roads of adjoining counties. The business men of Bloomington believe in extending the territory served by them and are willing to invest their money in the rural roads as the best means of bringing about this result. As is usually the case, what is best for the rural community is best for the county-seat, and vice versa.

In the construction of a county unit road now under contract, from $1,500 to $3,000 per mile is being spent on bridges of less than 20-foot span, and on culverts, clearings, and grading to a width of 22 feet, with a maximum gradient of 10 per cent. In two instances so far, it has been necessary to have an 11 per cent grade. State highway engineers are now making surveys for the purpose of getting away from a great many of the steep grades in Monroe County on state road No. 22. It looks as though they will have to relocate the road for almost the entire distance through the county if they are to secure as low a maximum gradient as roads with such heavy traffic should have.

Construction Methods

In Monroe County it is not necessary to roll the subgrade. The stone is hauled to the road in 5-yard trucks weighing 12 tons loaded. The wheel treads are 14 inches, and the drivers are bound to distribute the bearing well over the subgrade to prevent it from rutting. The subgrade is crowned 1½ to 2 inches on the center 12 feet, and 6 to 7 inches from the center line to the ditch.

On the subgrade a 9-inch layer of stones,

12 feet wide and of sizes passing a 3-inch ring, is laid. A 4-inch top layer of screenings is then laid. The character of the stone has very much to do with the amount of screenings made. The fineness of the crushing should be such that it will yield a generous 4 inches of screenings rather than a scant 4 inches. The cost of the stone is close to a dollar a linear foot.

Thirteen-inch boards with 13-inch pins in the center are used, the pins being set after the 9-inch layer is placed, so that the trucks will pass over them. The screenings course is kept up close to the first course, neither one being rolled. The boards are not banked, and when they are removed the edge of the stone is raked outward one foot on each side. This beveling makes it easier for traffic to get on or off the stone and helps in widening the stone by traffic so that in time the metaled way becomes about 16 feet wide.

Three or four times during construction the wheel ruts in the stone are filled by using the grader, and during the first year after completion the county road superintendent frequently runs the grader over these roads to smooth them up. In a period of one year the traffic will have bound the roads in fairly good condition. The people in most localities where this type of road is being built seem very much pleased to get them without the expense of rolling and waterbinding.

When rebuilding very heavy traffic roads where a width of 18 to 20 feet is necessary, the county builds water-bound roads, there being about 50 miles of them in the county at present. It is only a short time until it is necessary to make use of the traffic to bind the roads, and this is then kept up the same as on the roads described above, which are rolled by the traffic itself. If the traffic on a road justifies waterbinding, it justifies the additional expense of putting some wearing surface on top of the water-bound parts to take the wear of traffic.

The methods of maintenance followed in Monroe County by the State Highway Commission's maintenance department are thought to be the best for these roads, so that the county is using this plan as far as possible on old roads in repairing them. The greatest damage to Monroe County roads is from erosion because of the high grades so frequent in the county. This condition is always accompanied by very low tax values, and the two do not make a very happy situation.

ACKNOWLEDGMENT.—From a paper read at the Eleventh Annual Road School, at Purdue University, Lafayette, Ind.

Chicago's Residential Street-Lighting Program

First Installation of 6,500 Standards Proves Value of Comprehensive Plan

CHICAGO has embarked on an extensive program of modern residential street-lighting improvements. Since last summer it has installed 6,500 new lighting units as part of a comprehensive plan, and they have proved so satisfactory that 6,500 more have been ordered—in March, 1925. The effects of the betterment are reported by citi-

NIGHT VIEW OF RESIDENTIAL STREET IN CHICAGO

THE SAME RESIDENTIAL STREET IN THE DAYTIME, SHOWING TYPE OF STREET-LIGHTING UNITS

zens to be, not merely safer and more convenient travel for both vehicles and pedestrians, and enhanced appearance of the streets, but a feeling of greater security in respect to life and property, and increased real estate values.

On August 1, 1924, the city began supplanting the aerial electric and gas and gasoline lighting units in the residential sections with modern electric lighting units installed on concrete standards. So rapidly did the work proceed, that by March 1, 1925, approximately 6,500 of the new units, covering an area of 11 square miles of city territory, and 220 miles of streets, had been installed and were in operation. This was done at a cost of $1,600,000. During the present year it is expected $2,000,000 more will be devoted to continuing the work. When this is completed, Chicago will have one of the most extensive residential street-lighting systems of the modern type.

The lighting unit, which was chosen after a careful investigation of different types and after various cities had been visited, is a G. E. Novalux of a special form for this installation, known as the Chicago type. It is equipped with a 250-candle-power incandescent lamp in a rippled glass globe. This unit is similar to the standard Novalux, but the bottom of the globe has greater curvature. The top canopy is an aluminum fitting of natural finish and is designed to support possible future improvements in the form of reflectors or refractors that become economically available. The use of this type of fixture will permit the renewing of lamps and testing for trouble by the mere removing of the canopy. It is expected that it will also decrease the breakage of glassware, as the globes need not be disturbed. The fitters are also of aluminum to correspond in appearance with the concrete standards on which the units are installed. This is thought to be the first instance in which aluminum with natural finish has been used for these purposes.

The units are mounted on concrete standards designed by the Chicago Department of Gas and Electricity. The standards are 10 feet 9 inches high and 18 inches wide at the base, and are cast separate from the foundation to which they are bolted. The standards are installed in staggered arrangement at approximate intervals of 150 feet. The center of the foundation is placed 36 inches from the inside edge of the curb in order that the danger of injury to the post from motor vehicles may be lessened. The mounting height of the light source is 12 feet.

Alleys for the removal of garbage, ashes, and rubbish, and for entrance to garages, are a feature of many Chicago residential blocks, and therefore, while the approximate spacing of the standards is 150 feet, the lamps are so arranged that each end of an alley is lighted by one of the units.

The work of installation and construction was done both by contract and by the city's day labor forces. Approximately 2,400 units were installed by the former, and 4,100 by the latter. The cost of installing the new system is equivalent to 80 cents per frontage foot, and the operating costs 11 cents per frontage foot per year, as compared with an installation cost of $1.10 and an operating cost of 22½ cents per foot for the last installation previous to this one. The expense, however, is borne by the city at large and not by the individual property owners affected.

Three Years of Municipal Railway Operation in Detroit

MAY 15 last marked a period of three years since the city of Detroit took over the local railway lines. They have been years crowded with activity. The record speaks for itself. The principal facts are well worth reviewing.

Sequence of events is desirable in some stories, but not in all. First in importance, perhaps, is the fact that the average fare under municipal ownership in Detroit is 6.10 cents. This compares with 7.17 cents, the average fare in the United States. From the March operating statement of the railway department at Detroit, the latest one available at this writing, it is found that the average fare in Detroit that month was less than the average paid in Chicago, St. Louis, Boston, San Francisco, Milwaukee, Kansas City, Washington, Cincinnati, Denver, and in New Jersey. It indicates a saving for the car riders of Detroit of $165,000 for March, or at the rate of $2,000,000 a year, compared with the fares paid by the car riders of these other cities.

It was made mandatory that the Detroit system be run as though privately owned. Best of all, it is so run, despite the low fare. In three years the municipal railway has earned a surplus of $1,870,255 after paying all operating expenses and unusually heavy fixed charges. This surplus has all been returned to the property in the shape of repairs and renewals. Moreover, the city is providing through a sinking fund for an amount to pay the cost of the bonds for the original municipal ownership construction, and to meet the final payment on the purchase price when it falls due. It has paid interest on all its obligations, and has met semi-annual payments on the purchase price as they fell due. This means semi-annual payments of $500,000 on the purchase price, and provision through a sinking fund for the payment of $7,580,000 at the end of ten years.

Expressed in dollars, the record of the Department of Street Railways at Detroit shows the following:

$63,000,000 for operating expenses, taxes and reduction of debt

$6,000,000 for interest on fixed charges

$8,000,000 for the reduction of fixed charges, either by direct payment or into a sinking fund

$2,250,000 for taxes to various governmental agencies, city, county and state

The physical side of the picture is expressed by:

17 miles of track entirely rebuilt

378 new cars purchased and 50 cars built in the Department's shops

42 miles of bus routes

19 miles of extensions built into new territory

Approximately two-thirds of all the overhead structure taken over from the private company has been renewed.

To meet with changing transportation methods, 75 busses are being purchased from the fare received, from which it appears that the Detroit street railway is progressing along the same lines as are privately owned companies toward a coordinated system of urban mass transportation.

Not only this, but, based on the earning capacity of the property, the city of Detroit will at the end of thirty years, or in 1950, have a transportation system free of debt and paid for from the fare received for the service rendered, whether the service be by electric car, bus, or a coordination of these two.

Just because Detroit happens to be a community of 1,000,000 does not mean that there are no lessons in Detroit's experience for communities smaller in size than the Michigan metropolis. Detroit has poured millions of dollars into its municipal railway, but these millions have been spent wisely. The answer is not to be found in the cost, but in the results achieved. Results at Detroit speak for themselves. New trails have been blazed both in engineering and in transportation—so much so that it is not unreasonable to believe that the Detroit municipal railway, were it eligible to compete, would be in a fair way to win the Coffin award, made yearly at the annual meeting of the American Electric Railway Association, "to that electric railway company in the United States which during the year has made the greatest contribution toward increasing the advantages of electric transportation for the convenience and well-being of the public and for the benefit of the industry." That last phrase lets the city of Detroit out. Perhaps it is just as well. If the city could compete, the jury might be embarrassed in deciding between private and public enterprise.

Village Planning and Replanning

By Wayne C. Nason

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IN the United States nearly 20,000,000 people, or about one-fifth of the population, live in villages. These tens of thousands of villages are also the service stations of more than 30,000,000 farming people, for purposes of business, education, religion, health, and social well-being. Thus the lives of almost half of our population are intimately affected by village conditions. These people, classed as "rural" by the census, produce practically all of our food supply, send leaders into nearly all walks of life, and are the chief conservators of our national ideals.

The approaches, arrangement, sanitation, and attractiveness of these villages, upon which a sound and healthy economic and social country life depends, are of vital importance to the half of our population living in the villages or using them throughout a lifetime. Villages should be easy of access; approaches should be direct, durable, and enjoyable. Physical layouts should be based on naturalness, healthfulness, and convenience; housing conditions should be sanitary, convenient, and economical; dwellings should be satisfactory to the eye and set in pleasant surroundings. There should be clean and well-kept lawns, tree-bordered streets, and good architecture.* Dump-heaps and congested places should give way to open spaces; and public parks and playgrounds, lake shores, spots of natural beauty, and points of historic interest should be set aside for the use and enjoyment of all. Public buildings should be so located and arranged as to facilitate business efficiency and stimulate civic pride.

All villages cannot have all these improvements at once, but they can overcome self-satisfaction and plan specifically for the betterment of conditions. The sooner these changes are planned, the more easily they will be realized, year by year, even though only one improvement at a time can be made. The plan can be drawn before the village is started, taking into account existing natural conditions and allowing for necessary changes in the future. If the plan is flexible and the goal is always kept in view, the village may easily direct its growth and development, thus avoiding the necessity of making itself over later under great difficulties and at great expense.

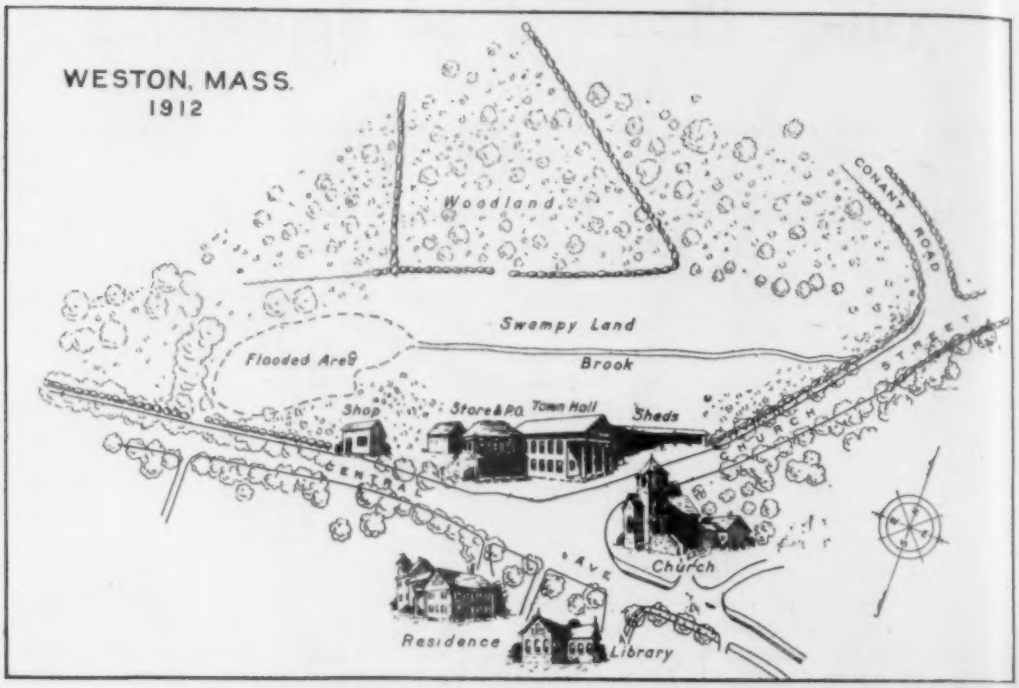
The day of isolation has passed. No longer can villages afford to be ugly and unknown. Modern methods of transportation and communication have opened up the hidden places. Millions of tourists travel thousands of miles annually over improved highways. European villages have long realized the economic value of the tourist traffic and have prepared to take advantage of it. They have found that beauty pays, and discovered the inefficiency of the commonplace and the efficacy of individuality and physical distinction in towns as well as in people.

Village planning, whether original or continuous, is not merely a theoretical idea. It is the foresighted application of ordinary business methods in the making of public and private improvements, so that physical development will go hand in hand with social and industrial progress. It is not just a new way of spending money. It is the application of good business principles to the necessary spending of money; the spending of a little to-day that a much greater amount may be saved later. In truth, it is real conservation of public property and genuine economy of public funds.

A Village Replanned

A good example of a village with little original planning, which recognized, though tardily, the need of a more attractive and efficient arrangement, may be found in Weston, Mass., a town of 2,282 people, which has recently established a civic center, at the same time doing away with a disfigurement of the landscape. The plan had been agitated for 25 years, but the 200th anniversary celebration of the founding of the town aroused the interest needed to initiate the enterprise. The desirability of a civic center was brought to immediate attention through the proposed location by the town authorities of a new fire-station house at a place which did not fit in with the improvement plan.

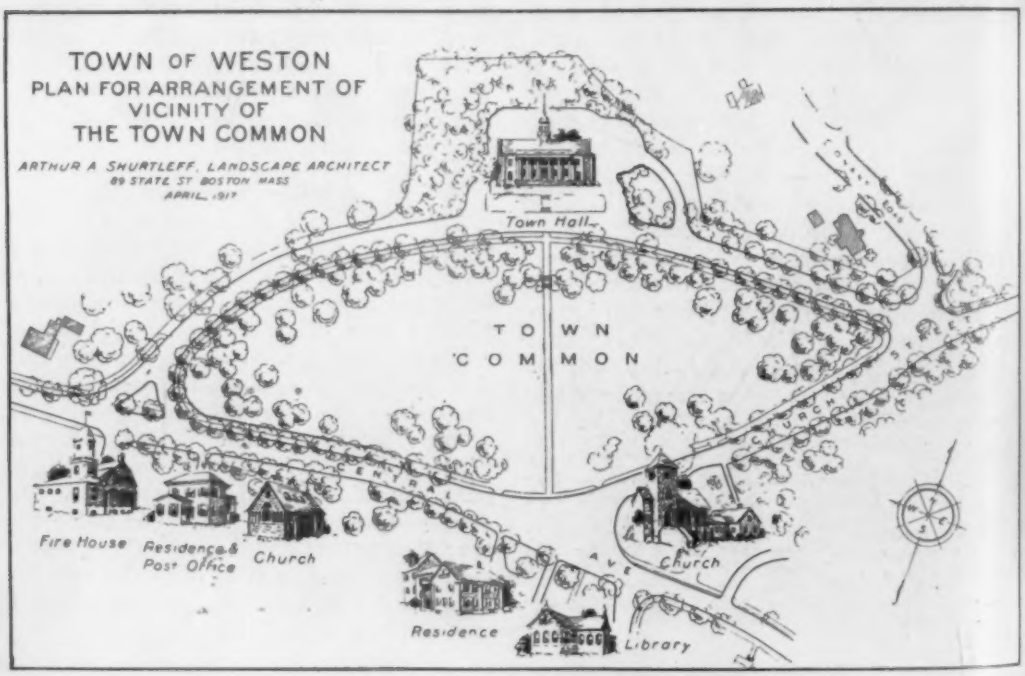
* "It is time that courts recognized the esthetic as a factor in life. Beauty and fitness enhance values in public and private structures . . . . . People are beginning to realize this more than before and are calling for city planning . . . . . ."—From the epochal decision of Justice Andrew Holt of the State Supreme Court of Minnesota in the case of the Twin Cities Building and Investment Co. *v.* City Building Inspector James G. Houghton.



THE TOWN CENTER OF WESTON, MASS., BEFORE REPLANNING

The objects of the originators of the civic center were: (1) to have important public buildings, including the new fire-station, centrally grouped; (2) to prevent an undesired development of an open space in the center of the village about which the erection of small, poorly planned buildings was contemplated; (3) to remove unsightly small shops and old, unattractive buildings already about this place; (4) to reclaim low, swampy ground, conducive to disease, forming part of this central open space; and (5) to make over this central open space into an attractive town common.

Fronting the central open space at an im-



THE REPLANNED TOWN CENTER OF WESTON

portant street intersection and facing the main street was a group of old buildings, consisting of a general store and post office, the town hall, small tailor and shoe-repairing shops with barns and shed. The old post office was moved across the street to a prominent position in the proposed new civic center and was rebuilt. The Town Hall was torn down, and a new building of dignified and attractive design, with well-prepared ground improvements, was erected on an elevation facing the opposite side of the open space. One shop was removed to a less conspicuous but still central place, and the other shop, sheds, and barns were destroyed.

The offensive swamp land occupying the space between the moved buildings and the new Town Hall was drained, filled in, graded, seeded to grass, and planted to pine, fir, and chestnut trees to form a town common. The oval shape and undulating topography give it distinction. The new fire-station, of durable materials and good design, was placed beside the post office, nearly opposite the entrance to the common. A well-built graveled road, one-third of a mile long, was constructed on the side of the common facing the hall. This connected with the main street in front of the common, the two forming an elliptical roadway around it. Wide graveled walks were constructed on both sides of the common and one across it, connecting the main street with the new hall.

To conform to the harmony of the new civic center, the church, located near the post office, was reconstructed and made more attractive in building and grounds. The library was built a few years previous to the contemplated

SOME OF THE BUILDINGS IN THE OLD TOWN CENTER OF WESTON

END VIEW OF THE TOWN HALL IN WESTON, SHOWING NEW APPROACH ROAD AND THE COMMON

new development, but with the anticipation of conforming to it when completed. It was well designed and set in attractive grounds near the church. Recently another church whose architectural features and setting combine well with the new scheme of things was erected near the post office.

Three streets approach the common by curves, forming a smaller open space with a fountain and flagpole in the center. About this are placed the two churches, library, new fire-station, and post office and general store, while the new Town Hall occupies a commanding position across the oval common.

These improvements were planned by a landscape architect and were developed in a natural way by the Town Improvement Committee. The town took the land by right of eminent domain, voted upon at town meeting, and owners were awarded damages. No lawsuits resulted. The project was financed through taxation and also by means of donations.

ACKNOWLEDGMENT.—From "Rural Planning—The Village," published March, 1925, by the United States Department of Agriculture as Farmer's Bulletin No. 1441. The bulletin is a 48-page pamphlet containing, in addition to the material above quoted, brief descriptions of planning and replanning activities in numerous villages in widely scattered sections of the United States.

What Size of City Can Best Be Served by Busses Alone?

TROLLEY cars will cease to run in Phoenix, Ariz., on October 20, 1925. The Phoenix Railway says it is at the end of its rope. Its attitude is that it has been misused. The attitude of the city is that the company has not lived up to its obligations. It is an old story with slight variations. In the past not all street railways have been so punctilious in their dealing with cities that they can turn the finger of scorn on the communites they serve. Sauce for the goose is likewise sauce for the gander.

There is wide difference of opinion over the merits of the issues involved in the controversy at Phoenix. If this were not so, the city and the company would not now be so far apart, with the matter in court. The controversy as a controversy is of interest, but perhaps of greater interest to other communities than the immediate issue is the outlook for the future when the Phoenix Railway does quit.

Time was, not so long ago, that in an emergency like the present Phoenix would have been very apprehensive of the future. It is apprehensive now, but it is not the same apprehension. It is not the apprehension that comes from the contemplation of a whole city possibly having to walk, but the apprehension that comes from not knowing just what is best to do about the proposals that have been made to the city to supplant the railway with busses. One thing is quite certain: Phoenix will not have to walk. Eventually, it may have to pay a fare higher than that charged by the railway, at present 5 cents, but it will not have to walk.

Two proposals to operate busses are before the city. Either gives promise of furnishing the city with a service quite as adequate as that of the present railway, and certainly more mobile. Should Phoenix go over to the bus, it will only do what a number of other cities of similar size have already done. That is the interesting point. In some cities of similar size, the railway is operating the busses. That is a detail. The significant point is that even among street railway operators, the fact is realized that in some respects the bus is a better vehicle than is the street car. Just where the line of demarkation as to the size of the city that can best be served by busses alone, as opposed to the trolley alone, is a matter that is very much in dispute. Even those who profess to know disagree about the matter. The extremist says that all trolleys will eventually go in cities of less than 100,000 population. The more conservative estimator says that the trolley is doomed in places of less than 50,000 population.

Seemingly, there is a place in mass transportation in cities beyond which the bus cannot be employed profitably at a fare commensurate with that at which the trolley can be operated profitably. But nobody has yet clearly defined the place of demarkation, if it is definable. In any event, it is a fact beyond dispute that in the last few years there have been 63 electric railway abandonments and that of these there were 25 instances where the territory formerly served by the electric railway received immediate substitution in transportation service by the installation of the motor bus. In the case of two abandonments, motor-bus substitution was made one year later; in four, two years later; in two, three years later; and three substitutions were made four years later. There were five immediate substitutions of busses for abandoned electric railways, but motor-bus operation was later discontinued in six instances where the territory formerly served by the abandoned electric railway did not require any substitute service, as it is adequately served by other electric railways or by the steam railroads. Of the total of 63 abandonments, 21 electric railways operated local service in towns ranging from 5,000 to 30,000 population, 25 operated on suburban routes, 4 on city and suburban, 2 city and suburban, and 12 interurban.

Another interesting point in connection with the controversy at Phoenix is that in November, 1923, municipal ownership of the street railway system in Phoenix, properly safeguarded by a tramway board of control, was recommended in a plan submitted to the city commission by the citizens' committee appointed by Mayor Louis B. Whitney to investigate the railway problem. The plan also contemplated the formation of a traction company to operate the system under a 20-year lease from the city. Nothing ever came of this proposal.

For a discussion of the problem of Trolley or Bus in the Small City, by Walter Jackson, see THE AMERICAN CITY *for September, 1924, pages 206-208.*

The Trend in Bituminous Pavement Design for Heavy Traffic

By Prevost Hubbard
Chemical Engineer, The Asphalt Association

IT is not intended to cover all details of design in this discussion, but rather to develop the more recent tendencies to modify or depart from principles and practices that have heretofore been generally accepted as being most satisfactory. In opening this subject for discussion, it is the intention of the writer to outline certain trends that have in recent years developed in connection with the design of asphalt pavements for heavy traffic. Some of these trends are so general and apparently logical as to indicate permanent modifications of past practice, while others are more or less experimental and have not been generally accepted.

There is a quite general trend toward the use of harder grades of asphalt than were previously considered satisfactory for heavy traffic conditions for all types of wearing surfaces. Nine grades of paving asphalt as determined by penetration limits were established by a conference of producers and consumers called by the United States Department of Commerce in 1923, these grades becoming effective on January 1, 1924. While no specific recommendations relative to the use of any particular grade for individual types of asphalt pavement were made by this conference, most of the asphalt pavements laid in 1924 were constructed with asphalt conforming to the grades which had been adopted.

For asphalt macadam construction, asphalt with a penetration of from 90 to 120 had heretofore been used more extensively than any other grade. This grade was abolished by the conference, which, as a substitute, provided for asphalt of from 85 to 100 or from 100 to 120 penetration. While a great many engineers who had previously specified 90 to 120 penetration then adopted the 100 to 120 penetration limits for asphalt macadam, it is believed that there has been a very definite trend toward the use of 85 to 100 penetration asphalt for such work, and these limits are generally approved by The Asphalt Association when the asphalt macadam is to be subjected to heavy traffic, even in northern localities. In the South, asphalt with as low a penetration as 50 to 60 has been successfully used with very little trouble in so far as application is concerned, but a grade as hard as this is not to be generally recommended for use at present.

As an exception to this matter, it should be noted that in New York State there has always existed a tendency to favor a softer grade of asphalt for asphalt macadam construction than elsewhere, the claim being advanced that application is frequently made near the end of the working season when the weather is cold and that difficulty is then experienced in securing proper penetration of a harder grade of asphalt. The writer does not believe that this reason justifies the use of extremely soft asphalt. It would appear quite possible for such work to be planned so that the construction can be carried out under favorable conditions. In Massachusetts and Rhode Island, where temperature conditions are not far different from those of New York, harder asphalt is commonly and very successfully used. It is the writer's belief that for most of the heavy-traffic roads in New York State, which could successfully be served by the asphalt macadam type of pavement, asphalt with a penetration of from 85 to 100 should be used, and the only cases where an asphalt of softer than 120 penetration could be recommended would be in the extreme northern portion of the state under light traffic conditions. I understand that the

Outline of Discussion

The design of bituminous pavements may very logically be discussed under the following two main subdivisions:

1. Design of bituminous wearing courses, including all types of bituminous paving mixtures as such

2. Design of pavement structures carrying a bituminous wearing course, including total cross-sectional designs as affected by the selection of various types of foundations

present practice is to specify an asphalt of from 120 to 150 penetration, although in the past very much softer asphalt has been used by the state. It is evident, therefore, that in spite of the fact that this state is using comparatively soft asphalt, the trend toward the use of a harder grade has developed. It is believed that the use of too soft an asphalt in the past has been responsible for the unsatisfactory condition of a considerable mileage of the older asphalt macadam pavements.

Hot-Mix Types

In the hot-mix types of construction there has developed quite a marked tendency to use harder asphalt than in past years, and this is particularly true of the fine-aggregate types of paving mixtures. Accompanying this trend is the tendency to specify a higher percentage of mineral filler passing the 200-mesh sieve. Both modifications of past practice have in view the production of mixtures which when properly compressed will offer greater resistance to displacement under heavy traffic. As an example, for sheet asphalt construction, an asphalt of from 40 to 50 penetration used to be considered sufficiently hard for the heaviest traffic pavements except in very hot climates. Now the use of 30 to 40 penetration asphalt is not at all uncommon and is favored in a number of our larger cities. The most recently resurfaced section of Fifth Avenue was constructed with this grade of asphalt, which has also been used on other heavy-traffic streets in New York with entire success.

In former years the commonly accepted standard heavy-traffic sheet asphalt paving mixture called for the presence of about 13 per cent of mineral filler passing the 200-mesh sieve. Now a higher percentage is being favored by most engineers who have made a special study of such mixtures, and some of the most progressive are advocating from 16 to 22 per cent of 200-mesh material. In this connection it may be of interest to note that we have recently devised a simple laboratory test for determining the stability of asphalt paving mixtures and have under way a very comprehensive investigation of the various factors influencing this property. The results so far obtained have been published in a number of technical papers during the last few months, and the important part played by mineral filler has been definitely indicated by these results.

Eliminating the very important part played by asphalt as a binding material for the mineral aggregate, it has been quite clearly demonstrated that with any given sand grading the addition of mineral filler in increasing amounts up to 30 per cent invariably increases the stability of the mineral aggregate. A comparison of results obtained with different sand gradings also brought out some interesting relationships which may ultimately result in important modifications of our specification limits for mineral aggregate grading. For instance, it was found that what we had previously considered as an ideal light-traffic sand grading developed greater stability than the generally accepted heavy-traffic grading when over 12 per cent of limestone dust filler was added to each. It was also indicated that our usual specification limits for the grading of asphalt sand, while safe, are too restrictive, as a number of sands which failed to meet the usual specification limits showed higher stability values when mixed with 15 per cent of mineral filler than those sands which met specification requirements.

Comparisons of Different Mineral Fillers

During this investigation, a comparison of the relative value of different types of mineral filler proved of special interest. Limestone dust and portland cement are at present more extensively used as fillers than any other materials, and considerable diversity of opinion has existed as to the relative merits of these two products. There has been a general inclination upon the part of engineers to specify the use of portland cement filler when designing pavements for very heavy traffic, but, so far as the writer knows, no tangible evidence has ever been produced to substantiate this preference. Our test results indicated quite clearly that so far as the stability of the mineral aggregate, exclusive of asphalt, was concerned, limestone dust is in no way inferior to portland cement for use as mineral filler. A variety of materials other than limestone and portland cement have been proposed for use as filler in asphalt paving mixtures, and it is quite possible that some of these products may be as well or better adapted for use than the products mentioned.

Hydrated lime, because of its very general availability as a commercial product, its extreme fineness, and its comparatively low cost, has been receiving some consideration from this standpoint, and during 1923 this material was employed in the construction of a short experimental section of sheet asphalt pavement in Baltimore, where it was used to the extent of about 11 per cent of the total mix. The results so far obtained have been rather favorable, although this particular sec-

tion of pavement has not been subjected to very heavy traffic. In the laboratory study of mineral fillers it was found, however, that hydrated lime when used upon a compressed-volume equivalent basis gave stability values at least equal to limestone dust and portland cement when used as a filler. As the compressed-volume equivalent of this product is nearly twice that of limestone dust, this means that approximately one-half as much hydrated lime as of limestone dust on a weight basis is required to produce a given degree of stability. This indication, of course, must be confirmed by service results before it can be finally accepted. The laboratory results are mentioned merely for the purpose of illustrating the importance of further study of mineral filler as having a most important bearing upon the design of ashalt paving mixtures best suited to withstand heavy traffic.

Increased Asphalt Percentage Not Desirable

Contrary to what might at first thought appear to be consistent with the use of more filler in asphalt paving mixtures, it has been found that a corresponding increase in percentage of asphalt is not desirable. As a matter of fact, the most recent trend in proportioning such mixtures has been to decrease the amount of asphalt previously considered desirable.

The importance of this factor from the standpoint of service results has also been convincingly presented by H. W. Skidmore, who reports on the behavior of two sections of pavement laid on Michigan Boulevard under practically identical conditions and subjected to a traffic of as many as 60,000 vehicles per day. Both of these mixtures contain a high percentage of mineral filler, averaging from 17 to 18 per cent. In one mixture, however, the average percentage of asphalt was 10.6 per cent, and in the other 11.7 per cent. The former contained about the percentage of asphalt formerly considered suitable in a mixture with as low as 10 to 13 per cent of filler, but satisfactorily withstood the heavy traffic without rutting or material displacement. The mixture containing the higher percentage of asphalt, however, in which individual samples showed as high as 13 per cent, was much less stable and shortly after construction developed waves due to displacement under traffic.

Care in Construction Most Important

The serviceability of an asphalt pavement under heavy traffic depends fully as much upon the care with which it is constructed as upon the design of the mixture. While, unfortunately, a universal tendency to improve construction methods has not yet developed, many engineers are devoting an increasing amount of attention to this matter. It is beginning to be realized that maximum initial compression of hot paving mixtures is essential for a heavy-traffic pavement if later displacement under heavily loaded vehicles is to be prevented. As a result, there is a very decided trend toward the use of the heavy three-wheel roller for initial compression of even the sheet asphalt pavement. Such practice is to be recommended and its general adoption appears quite likely, although there are still many contractors and engineers who prefer to first roll the mixture with a light tandem roller. In order to secure a desirable degree of compression in the newly finished pavement, a number of the more recent specifications now include a density requirement for samples of compressed mix taken from the street. Such requirement should of course be based upon the maximum practical density obtainable with a mineral aggregate of known grading combined with the proper proportion of asphalt cement.

More attention is also being paid to contour requirements of new pavements with the idea of eliminating surface irregularities which as they originally exist appear to be unimportant defects but may induce accumulative displacement under continuous heavy traffic. Greater precautions are being taken in connection with placing and raking hot asphalt paving mixtures so that with proper rolling a uniform contour will be developed. In some cases, widespaced, deep-pronged rakes are being used to thoroughly comb the mixtures, and the rakers are equipped with sandals carrying deep, narrow cleats, so that when they are obliged to walk on the newly raked mixture they will not compress it. In a further attempt to insure uniformity of contour, screeds or lutes are sometimes used prior to rolling. In so far as rolling itself is concerned, surface irregularities are often caused by operation of the roller at too high a rate of speed. The most recent specifications of the American Society for Municipal Improvements require that the roller shall be operated at a speed not exceeding three miles an hour. Rapid rolling tends to push the mixture ahead of the roller and produce surface irregularities which are difficult to entirely eliminate. Based upon actual measurements made on a newly completed section of Fifth Avenue

which was considered satisfactory in so far as contour was concerned, the American Society for Municipal Improvements has adopted a requirement for contour providing that the surface of the finished pavement shall be free from depressions exceeding ¼ of an inch in 6 feet, as measured with a 6-foot straight edge paralleling the center line of the roadway. For shorter lengths, a decrease of 1/32-inch allowable depression is made for every decrease of 1 foot, so that in a 1-foot length 3/32 of an inch is the maximum allowable depression.

Design of Pavement Structure Including Foundation

There are two general types of foundations now being used for heavy traffic conditions. These are the rigid type represented by portland cement concrete, and the flexible type known as black base, which is composed of a mineral aggregate bound together with asphalt.

The portland cement concrete foundation is more familiar to eastern engineers than the asphalt foundation. The 1:3:6 mix is still much more commonly used than any other mix for portland cement concrete foundations, but, owing to a desire to increase the slab strength of the foundation, a trend has developed in some quarters, based largely upon results of certain laboratory and field tests, to specify a richer mix. In this connection the writer refers to the Bates Road tests in Illinois and tests conducted by the United States Bureau of Public Roads at Arlington Farms. While the scope of this paper will not permit a detailed discussion of these tests, the writer wishes to state that in his opinion some of the conclusions which have been drawn are not warranted either by the tests themselves or by the service results so far obtained.

In connection with the richness of a portland cement concrete base mixture, it is true that a 1:2½:5 mixture will develop greater strength than a 1:3:6 mixture, but slab or beam strength is not necessarily the most important consideration governing the design of a pavement carrying a flexible asphalt top. The supposed advantages of using a relatively rich mix for base construction may well be, and are, in the writer's opinion, more than offset by undesirable characteristics attending the use of the rich mix. It is believed that use of a rich concrete base is not only an unnecessary extravagance but may actually produce less satisfactory results than a lean base. Especially where conditions tend to produce considerable movement through expansion and contraction, the cracks formed in a rich base are apt to be wider than in a lean base, thus producing open joints and corners, which are known to be one of the greatest sources of weakness in the all-rigid pavement. Moreover, wide cracks in the foundation are almost invariably carried up through the wearing course of the asphalt pavement. Cracking of the asphalt wearing course due to contraction cracks in the concrete base has already resulted from the use of the rich mix on a considerable portion of the highways in one of our Southern states, although practically no trouble of this sort has occurred where the 1:3:6 base has been used.

There has been some indication of a desire on the part of engineers more familiar with portland cement concrete construction than with asphalt construction to place construction joints in concrete foundations. Where this tendency exists, it cannot too strongly be condemned, both for reasons mentioned in connection with the development of wide cracks in the base and also because any flexible type of joint filler which may be used will be forced out of the joint when the concrete expands and will consequently lift the asphalt wearing course and produce a bump or ridge likely to lead to the development of serious surface defects.

Asphalt wearing courses on rigid bases are usually laid to a total depth of from 2 to 3 inches. Two inches is adopted for asphaltic concrete, and a total of 2½ inches or 3 inches is usually adopted for the sheet asphalt binder and wearing course. Where subgrade conditions are not extremely unfavorable, it is believed that the 6-inch, 1:3:6 concrete base is sufficiently thick for such asphalt pavements. If, on account of subgrade conditions, greater strength in the base is desired, a slightly increased thickness should be adopted rather than a richer mix. In connection with the Bates Road and Arlington Farms experiments to which reference has been made, it should be noted that attention has been primarily focused upon the behavior of the all-rigid pavement, and these investigations have led to decided modifications in the design of such pavements, modifications which are intended to remedy troubles which have developed in the past on account of the formation of cracks and subsequent disintegration of the pavement under traffic. So much attention has been paid to rigid pavement design that a strong tendency has developed to view all designs from this standpoint only and to apply to all

other types of construction principles which under careful analysis may be found to be of very minor importance to such other types, particularly those which are flexible or semi-flexible in character.

Thus, under ordinary conditions, a very slight deflection of a concrete pavement slab under a traffic load develops a crack which is considered to be a failure, as the crack starts progressive disintegration of the pavement. Yielding of the subgrade to the extent of a small fraction of an inch will cause cracking unless the slab is designed with sufficient strength to bridge this weakness in the subgrade. On the other hand, while the concrete base of an asphalt pavement cannot deflect without cracking, any more than a concrete pavement, when it does it is kept in contact with the subgrade, which prevents further appreciable deflection.

The flexible asphalt wearing course adjusts itself to the slight permanent deflection caused by the cracking of the base, without failure of any sort, and for all practical purposes the pavement remains intact. No surface cracks leading to progressive disintegration are produced, and the slight readjustment of contour extends over a sufficiently wide area to make it practically imperceptible. It has been repeatedly noted during impact investigations that the mere cracking of the concrete base under the application of loads does not produce failure of the asphalt wearing course.

It is true that wide cracks in a concrete base are sometimes carried through the asphalt pavement, but in general cracks produced in foundations by surface loads are not wide and are no more serious than the fine cracks produced in lean bases by contraction. It is therefore hardly logical to design the concrete base of an asphalt pavement to meet the same strength requirement as for an all-rigid pavement. To sum the matter up in a few words, what constitutes failure in a concrete pavement does not constitute failure in an asphalt pavement. Attempts to apply the same principles of design to both types have resulted either in requiring an unnecessarily thick concrete base, which is extravagant and prevents fair competition, or in requiring an unnecessarily rich mix base, which not only hinders competition but may be disadvantageous, for reasons previously mentioned. In this connection, there does not seem to be the same necessity for thickening the edges of the concrete base of an asphalt pavement as for thickening the edges of an all-concrete pavement, although some tendency has developed toward requiring the use of a thickened-edge base.

Asphalt Foundations

The most extensively used type of asphalt foundation is the asphaltic concrete base composed of a coarse graded asphaltic concrete quite similar in character to that used for asphalt binder course in sheet asphalt construction. The very extensive use of this type of base for heavy-traffic pavements in the Western states has been responsible for a decided trend towards its adoption in the eastern section of the country.

With the same amount of care in subgrade preparation, there is probably less chance of failure in a flexible foundation such as the asphalt base than in a rigid type of foundation. This is due to the fact that because of this flexibility it seeks to maintain constant and intimate contact with the subgrade and thus utilizes the supporting value of the subgrade to the maximum extent. Under many conditions that produce cracking in a rigid foundation, the slight yield of an asphalt foundation will maintain the pavement intact.

One of the principal advantages of asphalt foundation for use in the eastern section of the country lies in its ability to reinforce an old water-bound macadam or gravel road to such an extent that the old road may be entirely salvaged for foundation purposes. Under such conditions, a relatively thin asphalt base placed on top of the old road will produce a foundation satisfactory for heavy traffic with as little as 4 inches of old road material. Upon such a subbase an asphalt base of 3 inches with an asphalt wearing course of 1½ or 2 inches will successfully withstand very heavy traffic. Even under poor subgrade conditions such as encountered in the state of Illinois, black base has recently been used with entire success.

The asphalt macadam base is also being used to some extent in the eastern section of the country, and within recent years about 3 miles of pavement have been constructed in Springfield, Mass., where 2 inches of asphalt macadam base has been used to reinforce a 4-inch macadam so as to carry the usual standard sheet asphalt pavement. It is understood that this work has given entire satisfaction. The city of Providence, R. I., has successfully used asphalt macadam base in the construction of one of its heavily traveled granite block pavements.

ACKNOWLEDGMENT.—From a paper presented at the first annual convention of the Association of Highway Officials of North Atlantic States, at Atlantic City, N. J.

Basic Factors in the Solution of Metropolitan Traffic Problems

Summary of an Address before the Transportation Section of the Chamber of Commerce of the United States, at Washington, D. C., May, 1925

By Harland Bartholomew
City Plan Engineer, St. Louis, Mo.

THE three basic factors to be considered in the solution of metropolitan traffic problems are (1) unbalanced growth, (2) street design, (3) traffic regulations.

1.—Unbalanced Growth

Unbalanced growth, in the form of closely grouped buildings of excessive height, and too numerous crowd-producing businesses, such as theaters, hotels, and department stores, completely upset the most elaborate systems of traffic control and the most perfectly designed street systems.

Every city should approach its traffic problem by first adopting and enforcing a regional and city planning scheme providing for complete industrial, commercial, and social organization of its entire area. Traffic congestion occurs in very limited spots in every city. Rigid limitation of building heights and a reasonable spreading of crowd-producing businesses in congested centers is the fundamental step in solving the metropolitan traffic problem. Higher and higher buildings and ever greater concentration of business are not so much monuments of business enterprises as they are symptoms of economic waste. Witness New York's $500,000,000 expenditure for subways, with congestion greater to-day than ever before. The "congestion tax" of New York is estimated at $1,000,000 per day, of Chicago $600,000. We have scarcely begun to explore the field of relation of street space to building content and use.

2.—Street Design

The second step in meeting the metropolitan traffic problem is by the design of an adequate street system throughout the present and future area of the city and its region. Elements in the design of an adequate street system are:

By-pass routes for traffic that neither originates nor terminates within the region.

A gridiron of wide streets comprising the various traffic centers of the city and region.

A series of wide streets connecting the important centers of the region.

By-pass streets around each center.

Parallel streets or roadways for separation of the three distinctive types of traffic—auto trucks, street cars and busses, and passenger automobiles.

Separation of street grades where great streams of traffic cross.

Provision of well-designed pavements on all major streets.

Elimination of jogs, dead ends, and abrupt curves within traffic centers and on the streets comprising the main street structure.

Provision of not less than four lines of moving vehicles on each major street.

Widening the throat of particularly important intersections.

The ability of each city to design a completely satisfactory structure of major streets as outlined will depend upon its physical configuration, existing improvements, and legal and financial resources. Such a plan, once prepared, will gradually be susceptible of execution through united cooperation of public and private effort. Wasteful, piecemeal, and haphazard improvements producing no adequate returns will thereby be prevented.

3.—Traffic Regulation

Traffic regulation, the third and final step in meeting the metropolitan traffic problem, should always be devised in accordance with known traffic movements. Constant traffic counts will disclose the tendencies of traffic flow. Regulation should facilitate natural flow. Rigid and arbitrary traffic regulation unrelated to street design and natural flow may be more harmful than a certain degree of congestion.

Universal application of any new type of regulation or device is questionable and usually unwise. Depending upon conditions, certain regulations may be of value, as follows:

Synchronized or platoon movement upon heavily used thoroughfares of great length.

"Boulevard Stops" upon all major streets not under direct control.

Elimination of parking on all streets, or on important "through" streets in traffic centers during rush hours.

Limitation of parking (one hour or less) in traffic centers.

Segregation of traffic according to type.

One-way streets (more necessary on streets of restricted width).

Confinement of trucking to night hours in traffic centers, especially where no alleys exist.

Restriction of unnecessary traffic movement.

Pedestrian movement only with traffic when under control in traffic centers.

Attention should be given by all cities to the particularly valuable set of conclusions and recommendations of the recent Hoover Conference on Street and Highway Safety, especially that of a centralized authority having full responsibility in matters of traffic study, design and control.

EDITORIAL NOTE.—For the full text of the consolidated report of the Hoover conference, see THE MUNICIPAL INDEX for 1925, pages 339-346.

La Cite-Jardin de Kapelleveld

THE Belgian town-planning specialist, Van der Swaelmen, contributes to the *Seven Arts* of January 22, an article on the garden suburb of Kapelleveld. He deplores the manner in which the reconstruction of the devastated areas in Belgium has generally been carried out. With the exception of one or two groups of buildings, he considers that the results are a fiasco from an artistic and town planning point of view. He makes the somewhat surprising statement that the new dwellings are not even an economic success, since many of them remain untenanted. He turns with pleasure and relief to the contemplation of the garden suburb of Kapelleveld. This suburb owes its origin to two young men who appealed to Van der Swaelmen to help them in founding a Cooperative Tenants' Association. The site, comprising about 100 acres situated on a delightful plateau to the east of Brussels, was recommended to them by the National Society for Cheap Dwellings. With the help of the architects Hoste and Pompe, a plan for the layout of this site was produced. The new suburb will contain about 500 single houses and four blocks of flats, having shops or commercial premises on the ground floor, and five stories of dwellings above. These blocks will be grouped around a civic center for mutual recreation and education. The houses will be well spaced out, only about 12 to 2½ acres, and they will have ample garden ground.

The plan provides for wide avenues for fast main-road traffic; the dwellings will not be placed along these avenues, but will face quiet side roads. This is a new feature in town planning.

Every element which contributes to the charm of a garden suburb has been provided for in the layout. Turfed paths bordered with trees lead to the gardens; playing-fields are provided for young persons, and sand-pits for the children in the center of each group of houses.

In the opinion of Van der Swaelmen, the founders and designers of Kapelleveld will accomplish a true work of art.

—*Garden Cities and Town Planning*, April, 1925.

THE GARDEN SUBURB OF KAPELLEVELD, BELGIUM

Guiding the Growth of the City of Washington

To the Editor of THE AMERICAN CITY:

Public opinion pretty generally throughout the country is apparently shaping itself to consider, and probably to adopt, ways and means to guide the future growth of the Federal City by a carefully studied plan coordinating all phases of development. It is true that the nation may decide again, as it has in the past, that the great acreage of countryside over which the city of Washington is rapidly spreading, does not need intelligent study to determine either through what valleys the direct thoroughfares of the future should pass in order to escape destructive and costly grading operations, or through what valleys these thoroughfares or indeed any public highways should *not* pass in order to preserve from destruction streams, wooded stream borders and bluffs of priceless value for park purposes. Public opinion may decide once more, as it has decided so many times through inaction in the past, that none of the hills and picturesque ravines whose beauty and accessibility have brought them into the market for suburban estates and for house lots, should be preserved in public reservations for the enjoyment of all the people. It is also conceivable that through inaction the opinion of the American people may permit industrial plants to spring up in the midst of areas which are tending toward residence development, and may permit residence areas to occupy ground which is needed for industrial use and better devoted to that purpose. In short, the policy of drifting without adherence to a well-coordinated plan for all the growing activities of the city may be allowed to continue. Nevertheless, the belief is growing by leaps and bounds that the lethargy of public inaction in guiding Washington's growth will not continue much longer.

During the next few months or a year, while public opinion is shaping itself, there are, of course, many directions in which those who are technically interested in city planning can use their influence to assist wise final action. These directions evidently include, among others, discussion of the wastefulness of the drifting policy; description of the planning which is being done by other American cities; rehearsal of the enormously important work already accomplished for Washington by the L'Enfant plan; description of the subsequent work of the Senate Committee and of the Park Commission which reported in 1902 and whose work has been continued as far as lies in its limited power by the National Fine Arts Commission; account of recent departmental and district efforts toward highway layout and other single features of a plan; together with enumeration of the current efforts of architectural, landscape, fine arts, civic and other societies and organizations interested in a rational all-around development for the Capital City.

A Movement of National and Local Significance

This letter merits careful study, not only as a plea for greater concern throughout the nation with the future development of the nation's capital city, but also as offering practical suggestions as to how such concern can most effectively be stimulated. Intelligent interest aroused in any community in the planning of Washington will have a reflex value of no little importance to the home town. In many a growing city the same blunders are being made that Mr. Shurtleff emphasizes so graphically in the first paragraph of his letter. If our Federal City shall become an inspiring example of sustained interest and intelligent action in city planning, the benefits will spread in some measure to every city in the land.

Evidently the strength of these directions of effort lies in their appeal to the trained man. Unfortunately, the untrained man is not interested in technical articles or talks on the replanning of the city of Washington, because they seem dry, theoretical, and, worst of all, impersonal. The name L'Enfant leaves the man-in-the-street cold. Because that strange-sounding and apostrophied name is different from familiar American names, it carries no weight with the untrained man and even detracts from arguments which it should support. Similarly, "economy and efficiency of planning" makes little or no appeal to the man-in-the-street, because he cannot translate

these phrases when applied to the slow growth of the Federal City into terms which really affect his own pocketbook. When he considers his distance from the Capital and the relative smallness of a tax which might in any event be saved or lost by following or by failure to follow a rational plan, the importance of economy does not carry great weight with him.

On the other hand, the relation of George Washington to the plan of the city of Washington is a fact of vast, compelling interest which can be depended upon to gain and hold the attention of every American, no matter what his training. To the man-in-the-street there is nothing dry or theoretical in the part which was played in the planning of the Federal City by the man who was in the beginning a farmer and a surveyor and who became the savior of the Republic and its first President. That George Washington selected the site for the Federal City and gathered men about him who helped in the decision that the streets of this city should not grow irregularly, by chance, like the young Boston; or rigidly, by chance, like the newer Philadelphia; that George Washington decided, with others, that the streets, parks, and building sites of the National Capital should bear a rational relation to the hills, the valleys, and the river front, and should be planned for an area far in extent of the probable growth of a century or more; that George Washington wanted these things and labored to get them is proof enough to the ordinary man that the nation should take up the work where it was left, and carry it on with devoted foresight.

I have taken much space to say that technical men should not overlook the extraordinary and convincing nature of the remarkable appeal which ought for every reason to be brought to bear upon the replanning of the city of Washington through George Washington's relation to the plan. There is nothing new in this thought. It was one of the chief arguments in the far-reaching report of 1902 and undoubtedly gave to that portion of the report devoted to the Mall a large share of its remarkable success. We should frequently reread that report, if for no other reason that to gain greater familiarity with that argument. If that argument is widely used and rightly combined with the technical arguments for the preparation, by a properly constituted commission, of a well-coordinated plan for the ground upon which the National Capital is now spreading, public opinion cannot fail to find ways and means to carry forward a matter so vitally associated with the fondest memories of the Republic and so essential to the practical needs of a growing modern city.

That the movement toward a rational plan for the city of Washington is taking form during Mr. Coolidge's administration of economy should logically increase the chance of success of the movement. Consideration of long-time economy has always been and must continue to be the strongest reason for good planning. The waste of treasure and opportunity which is taking place where cities have grown to great size by the haphazard accretion of new streets to the broken fringes of earlier street systems, is being brought slowly to an end through considerations of economy. The pressure to end this waste is being exerted to an increasing extent by men who as a group have not heretofore taken so great an interest in city planning. Among these men are the builders, designers and financiers of office buildings, stores, industrial plants, and rapid-transit facilities, not to mention those who are responsible for the design and maintenance of parks, playgrounds, and parkways.

All these men are accustomed to the most tireless and painstaking planning in their own fields of work to make individual installations function as perfectly as human ingenuity can devise, but the best service of these structures, utilities, and amenities is often severely handicapped or wholly thwarted because the great city itself has not been planned with similar painstaking, intelligent effort. It is a fortunate thing for our modern cities that the planners of these smaller units are now beginning to realize more fully their dependence upon the wise planning of the great city, and are taking a hand as individuals or groups in this necessary work to see that it is done by properly constituted authorities and that these authorities study the problem thoroughly in all its phases to reach a well-coordinated plan.

The time has come when the city of Washington needs a faithfully studied, good plan for the guidance of its growth. The need for such a plan is great in all phases of the city's expansion and consolidation. The man in the street and the technically trained man are becoming aware of this need now as never before. A better time could not be chosen than the present, when considerations of economy are paramount, for these men to combine their efforts to secure national action for the creation of such a plan.

ARTHUR A. SHURTLEFF,
Landscape Architect, Boston, Mass.

Municipal Forests a Profitable Investment

By Charles Lathrop Pack
President, American Tree Association

TAKING a page from the experience of several European countries, where there are instances of the town or communal forest relieving the people of the community of taxation, providing them with a cheap source of wood supply and giving them a site for local recreation, not a few American communities have established local forests. There are nearly a half-million acres of this type of forest—a small number comparatively, but a beginning.

Establishment of the town forest means the setting aside of a tract of land by action of the community for the specific purposes of wood production. In some states an enabling law is necessary, to permit the communities to take such a step. This, however, is a simple piece of legislation, giving permission and requiring no appropriation. Frequently it is entirely unnecessary, leaving the initiative to the local communities themselves.

But why should a community create a forest?

In many cities and towns there is land that has reverted to the community for non-payment of taxes, or land that is lying fallow and paying only a mite of return in taxes. The first type of land has become the locality's own, and the second can be acquired for a very little. Most communities own properties in the form of hospitals, asylums, poor farms, or other institutional establishments, frequently with extensive grounds, more often than not, doing no productive work. Most cities and towns have water reservoirs that must be protected by a watershed of trees in the interest of public health. In some cases the community is so situated that the protection of timber growth as a barrier against the elements is advisable.

In one and all of these instances an area may be planted to trees or protected to allow the existing growth to mature. The forest that grows up can be managed for a yearly yield, turning into the treasury of the community an income. The acres become assets instead of "deadheads" on the tax rolls. Frequently through the state forestry department, and now under the McNary-Clarke Act, seedlings can be obtained free for planting. Advice on management and planting is available from state or federal government. Imagine being handed a check yearly instead of a tax bill, as is the experience of the residents of several communities in Europe owning their own forests.

This is the point of view from which the hard-headed business man would look at the town forest proposal. And its returns justify his support in this one feature of returns alone. But the significance and dividends of the town forest do not stop here. The economic argument is not the only one.

Educational and Recreational Values

Forest conservation and protection is a paramount issue in our nation. It is a matter of education. The town forest is a textbook. Will the members of a community jointly owning a town forest tolerate for one minute the citizen who leaves a match smoldering in their forest? No, their protective interest will be quickly aroused and must inevitably spread to a like interest in the larger and less personal areas of forest that they own as people of a state or the nation, or that their neighbor owns.

Going farther than this feature of general education, the town forest becomes an adjunct of the schools. Within its confines nature and forestry can be studied. Having been set aside and protected, the area becomes a sanctuary and refuge for wild life of all kinds. It becomes the center of the recrea-

tional activity of the community—as well—forming a vital link in the great movement in the United States toward the out-of-doors.

Thus, the town forest can pay for itself in dollars and cents, declare dividends every day of the year in healthful and valuable service to the community, and open the door to the work of conserving the many gifts of Nature. The state forest, larger and more important in the bulk of its products, serves a like purpose for the people of the greater political unit. They knit together to solve by united support the immense national problem of forests and timber supply.

EDITORIAL NOTE.—See notice of pamphlet, "Town Forests," by Harris A. Reynolds, on page 101 of this issue.

The Town Forest and the Taxpayer

Cartoon by Morris; copyright, 1925, by George Matthew Adams. This series of cartoons, prepared at the suggestion of THE AMERICAN CITY MAGAZINE, *are available for use in newspapers and local civic publications at small expense. Full particulars will be furnished by this magazine to those interested.*

The Possibilities of Central and District Heating

Valuable Report Submitted by Fuel Board, Dominion of Canada

THE possibilities of the application in Canada of the principle of central and district heating have been under the consideration of the Dominion Fuel Board for some time. It undertook an investigation to determine the present status and practice of district heating in other countries, and its report has recently been published by the Department of Mines.

Conclusions of Fuel Board

As a result of this investigation, the Dominion Fuel Board concludes that central heating of groups of institutional buildings and community heating of residential properties have shown economies and benefits which foretell their profitable adoption to an increasing extent. However, the adoption of such heating systems should be preceded by a detailed and careful study of local conditions, and of all the factors bearing upon the problem, in order that there may be a reasonable assurance of financial success. It is also pointed out that the benefits to be derived by consumers are not so much a saving in cost of service, but rather a greatly increased value of service in respect to convenience, relief from the handling of coal and ashes, increased cleanliness, etc., the total value of which it is extremely difficult to determine in terms of dollars.

The Fuel Board believes that, for a full utilization of available resources, consideration must be given to possible coordination in production and use of different forms of energy, such as the establishment of central steam stations acting in conjunction with hydroelectric developments for the supply of light, heat, and power.

Another interesting conclusion of the Board is that while the application of methods of centralized heating alone may not be looked upon as a considerable factor in the solution of the fuel problem in the provinces of Ontario and Quebec, nevertheless the replacement of small anthracite-burning units by centralized plants burning low-grade fuels will contribute towards the reduction in importation from the United States of high-priced anthracite coal, which is so rapidly becoming a luxury fuel of indeterminate availability.

Successful in United States

In the United States, district heating has now passed through the development period, and although financial failures and difficulties have been experienced in the past, as in the early stages of any other utility, the knowledge gained and advances made during recent years in design, construction, and method of operation assure the success of undertakings in suitable districts under proper conditions of application, correct engineering, protective rates, and efficient management.

Conditions Are Favorable

In many parts of Canada, conditions are particularly favorable to district heating: climate; high differential between the prices of coals commonly used for domestic heating and cost of low-grade fuels; and possible combination with electric power supply, both from steam and hydro plants.

A town of 4,000 population can be taken as the low limit in which district heating could be considered, and in actual practice, conditions would have to be somewhat special for an economic undertaking of district heating in any town under 10,000 population, such as a possible combination with a favorably situated municipal steam electric station or industrial plant, or a particularly progressive community willing to bear an increased cost of heating for the convenience and benefits to be derived therefrom. North Battleford is an example of the former case, where, with a population of only 4,000, district heating as a municipal enterprise in connection with the steam electric station has proved satisfactory. In the United States several instances of successful small-town heating can be cited. The particular field for district heating is found in the larger towns and cities, especially in the business and shopping sections where the heating and steam load is greater and more concentrated.

Peak-Load Stations

Water-power plants cannot be forced, and the highest load peak usually occurs during the winter months, when water may be low, or when ice creates difficulties. For these

reasons, the installation of steam stations to carry the peak load and to allow the hydro plants to operate at a high load factor is a matter which must receive increasing consideration, especially where the more favorably situated water-powers are becoming fully developed. As distinguished from water-power, steam plants can be located to suit the load distribution, and since such locations are as a rule in the neighborhood of the large urban centers the possible combination of electric generating and steam service and heating stations may, in many cases, prove the most profitable solution.

Such a condition seems to arise in Ontario, where steam peak-load stations are already being contemplated, and where there are the greatest number of cities of a size to support possible district heating and steam service. It would be useless, when dealing with districts which are covered by widely embracing hydroelectric systems, to specify any particular place where a steam peak-load plant might be profitably located, but the coordination of steam heating and hydroelectric service seems to provide a partial solution of the fuel problem in those provinces of Canada that are dependent upon imported coal.

Utilization of City Refuse

The burning of household waste, city refuse, and ashes from domestic furnaces, in modern destructor plants, furnishes opportunity for utilizing the heat of combustion for the generation of steam which could, in some cities, well be combined with municipal district heating plants. In Europe, such destructor plants are very commonly employed for the generation of electricity and the supply of steam for other services. In Canada, the possibilities for heat recovery are considerably greater owing to the larger amount of combustible matter discarded both in household refuse and coal ashes.

District Heating Systems in Canada

District heating in Canada is in its infancy. At present there are only two public heating utilities in operation. One of these is located in North Battleford, Saskatchewan, a city with a population of about 4,000. Fifty buildings are heated with exhaust steam from a central station, and the service has proved very popular. In many cases an actual saving, under the rates in force, is shown over the cost of individual furnace heating.

The following rates are charged for steam:

Condensate from Steam Supplied in Any Month	Per 1,000 Lbs.
For the first 3,000 lbs.	$1.25
For the next 4,500 lbs.	1.00
" " " 7,500 lbs.	.95
" " " 20,000 lbs.	.90
" " " 40,000 lbs.	.85
" " " 75,000 lbs.	.75
" " " 150,000 lbs.	.65
" " " 200,000 lbs.	.55
And for all over 500,000 lbs.	.50

Under the conditions existing at North Battleford, the advantage of district heating in conjunction with the generation of electricity has been clearly shown, and has resulted in a substantial revenue to the city.

The other public heating utility in Canada is located in Brandon, Manitoba. In 1910, a district heating system was installed in connection with the steam electric station, which is located in the center of the town, to serve the business and shopping district, covering an area approximately 1,500 feet by 1,000 feet. The franchise for district heating includes the entire town, but service is mandatory or obligatory only in the central business district embraced by the present lines. Almost all the buildings in the heating district are served, and it is reported that during the years that the system has been in operation there has never been a shut-down nor a customer disconnected.

Operating Statistics

The following figures show the amount of steam supplied in Brandon during the twelve months of 1923, with the corresponding mean monthly outdoor temperature:

	Lbs.	Temp. Deg.
January	15,605,000	9.9
February	12,585,000	2.5
March	14,022,000	4.6
April	7,652,000	29.9
May	2,399,000	51.5
June	632,000	64.1
July	754,000	67.8
August	686,000	58.5
September	1,233,000	54.
October	3,777,000	39.8
November	7,424,000	31.5
December	11,363,000	12.8
Total steam for year	78,132,000 lbs.	

Gross revenue from steam sales	$69,743.09
Average cost per 1,000 lbs. steam sold	89.2 cents
Total electric current generated	4,733,300 kw. hr.

University Central Heating

The University of Toronto buildings are the largest group in Canada to be heated from a central plant. They comprise 27 buildings, with an aggregate volume of nearly 29,000,000 cubic feet.

In 1910-11, prior to the installation of the central heating system, the cost of heating alone for the buildings then erected was 41

cents per square foot of radiation, anthracite coal at about $7 per ton being used in the individual heating furnaces. Electric current for light and power was, at that time, partly generated in different buildings and partly purchased.

With the central plant, in 1914-15, before prices of coal and labor started to rise, the cost of heat and light was 20.1 cents per square foot of radiation, including all charges for distribution up to the building lines. Bituminous coal was then burned, at a price of approximately $3.50 per ton, delivered.

In 1922-23, bituminous coal averaged $8.34 per ton, delivered, and the total cost for supplying heat, light, and power amounted to 43.852 cents per square foot of radiation; or, for heating alone, 38.255 cents per square foot.

During the season of 1922-23, 9,706 tons of coal were used, which corresponds to a consumption of 0.7 pounds per cubic foot of building for heat, light, and power, or 79 pounds per square foot of radiation installed. A boiler test carried out in the central plant in 1921 showed an efficiency of 76.4 per cent.

These figures speak for themselves as to economy of central heating. The present cost of heating is less than was the cost of individual heating thirteen years ago, although the price of coal has increased approximately 230 per cent during that time. The complete services of light, heat, and power are now supplied at only a very slight increase over the cost of heating alone in 1910, with anthracite at $7 per ton. Considering what the present cost of individual heating would be with anthracite at $16 per ton, coupled with the conveniences obtained by heat generation and control at one source, the results more than justify the installation, after allowing for all fixed charges on the investment.

Other Installations

In addition to the University of Toronto buildings, large central heating plants have been installed at the Dominion Government buildings, in Ottawa, the University of Alberta, Edmonton, and McGill University, Montreal, with similar satisfactory results.

Although the proposition is not yet undertaken, the city of Winnipeg proposes to maintain a district heating plant in conjunction with the hydroelectric system. Winnipeg has the lowest mean temperature of any of the large cities of Canada, and this fact, among others, has led to a decision by the city to install a district heating system to serve the business and shopping districts. This system will be in connection with a steam stand-by station, which is needed, in any case, for electric power supply. From preliminary reports and announcements, the steam sold will be in the neighborhood of $1 per 1,000 pounds.

Prizes Offered for Essays on the Housing of Intellectual Workers

FOLLOWING his recent inauguration of a movement for better housing for intellectual workers in the United States, Willard Reed Messenger, of New York, announces that the Federation Internationale du Batiment et des Travaux Publics, with headquarters in Paris, has accepted his offer of $1,000 for three prizes to the winners of an international essay contest on the subject.

The first prize will be $500, the second $300 and the third $200. Citizens of all countries will be allowed to compete. The details of the competition and the judges will be announced later. Hon. Myron T. Herrick, United States Ambassador to France, and Willis Booth, President of the International Chamber of Commerce, both of whom are deeply interested in the subject, have been suggested as the American representatives on the committee of judges.

In the letter which contained his offer, Mr. Messenger suggested that the articles, which should be limited to about 5,000 words in length, might deal with architectural or structural features, materials, interior arrangement, equipment, gardens, interior and exterior color schemes, environment and social amenities, economies of production, accessibility, esthetic features and creation of atmosphere, financing, or other pertinent aspects of the subject, together with practical methods of procedure to attain the desired completed results within the means of an average brain-worker. Covering such a broad ground, he thought the competition would attract not only engineers, interior decorators and architects, but enonomists, industrial leaders, authors, journalists, psychologists, college professors, students, and intellectual workers generally.

Further information can be obtained from Mr. Messenger at 50 East 42nd Street, New York.

ROAD USERS SHOULD PAY ENTIRE COST OF MAINTENANCE OF IMPROVED HIGHWAYS

"With respect to highways, the Chamber now supports the propositions that regulatory bodies should facilitate the utilization of motor transport wherever experience indicates it will be in the public interest; that rates and services of motor common carriers, both freight and passenger, should be subject to regulation by state and federal commissions having jurisdiction over other common carriers and that road users should pay the entire cost of maintenance of improved highways through special taxes levied against them and applied exclusively to that purpose."

—From the annual report of the Board of Directors of the Chamber of Commerce of the United States, May, 1925.

Water-Supply Statistics for Municipalities of Less Than 5,000 Population—VI

Statistics from 3,700 Cities Compiled for Publication in THE AMERICAN CITY and the 1925 Municipal Index—The Following Explanatory Material Is Reprinted from Our February Issue

THROUGH the cooperation of municipal water-works officials and the officers of water companies, THE AMERICAN CITY MAGAZINE is able to offer to its readers and to recipients of the 1925 Municipal Index the largest compilation of water-supply statistics that has yet been published. In order to facilitate the distribution of these statistics, all the data for cities of over 5,000 population are being published in the 1925 Municipal Index, and for cities of less than 5,000 population in THE AMERICAN CITY MAGAZINE serially, beginning with February, 1925.

The tables, in which the cities are arranged alphabetically by states, show whether the water-works are owned by the municipality or by a private company. The source of supply is recorded merely as underground or surface, the former including shallow wells, deep wells, artesian wells, flowing springs, and mountain springs, and the second such sources as rivers, lakes, ponds, canals, and creeks.

The distance of the source from the city is an important matter from the fire protection standpoint as well as from the standpoint of comparison when it comes to capital investment. Storage facilities are described under three heads, namely, reservoirs, stand-pipes, and elevated tanks.

Filtration systems are divided into mechanical or American systems, slow sand filtration or the older type of filtration, and pressure filters, as applied to the mechanical filtration. In examining the entire set of reports, only chlorine and hypochlorite show as American sterilization practice to-day, with liquid chlorine by far the most common method.

In order that some idea of the total investment in pumps may be reached, the total pump capacity in million gallons daily is recorded. In some instances where low-lift pumps are used to move water from a river to a filtration plant and then high-lift pumps are used to force the filtered water through the distribution system, the total pump capacities may give an erroneous idea as to the capacity of the system. Lack of space, however, made it impossible to differentiate in these cases, as the pump capacity is recorded chiefly to show the investment in this element of the plant.

American cities are noteworthy for their excessive consumption of water. Even communities where industrial uses are not great have consumptions of 500, and some even as high as 1,000 gallons per capita. As far as possible, in these statistics domestic services are differentiated from those supplying stores, factories and industries.

Statistics are given for the number of hydrants in each city and whether they are owned by the municipality, or by the water company. The average rental per hydrant per year is given in those cases where a hydrant is charged to the water company or is credited to the account of a water department. In many cases water companies charge no hydrant rental, as such service is required in their franchise. Unfortunately, in only a few cases are water departments credited with the maintenance of the hydrants.

The average pressures for water-supplies, as well as the increased pressures for fire service, are given, as this has some bearing on the general type of pipe in use.

The following symbols are used throughout these tables to make it possible to give a greater amount of information in small space:

A —American type, rapid or mechanical filter
B —Brass pipe
C —Concrete pipe
Ch —Sterilization by liquid chlorine
Cl —Cement-lined pipe
Co —Copper pipe
F —Pressure filter
G —Galvanized iron pipe
H —Consumer or householder
Hy—Sterilization by hypochlorite
I —Cast iron pipe
K —Kalamein pipe (also Calamein and Calamine)
L —Lead pipe
Ll —Lead-lined pipe
M —Municipally owned
O —Slow sand filter
P —Owned by private company
Pp —Stand-pipe
R —Storage or distribution reservoir
Ri —Rolled iron pipe
Tc —Terra cotta pipe
Rv —Riveted pipe
S —Surface source of water-supply
So —Water softener
St —Steel pipe
T —Elevated tank
Tl —Tin-lined pipe
U —Underground source of water-supply
V —Vitrified pipe
W —Wood pipe
Wr—Wrought iron pipe

Municipality Ownership of Water works	Population	Source Type	Source Aver. Miles from City	Storage	Filters	Sterilized	Distribution System Total Miles of Main	Distribution System Kind of Pipe Mains	Distribution System Kind of Pipe Services	Pipe Sizes Inches Mains	Pipe Sizes Inches Services	Pump Capacity m. g. d.	Main Supply Metered
South Carolina (Con.)													
Walhalla...M	2,068	SU	4.0	RT	O	No	9.0	I	LG	1½-8	¾-4	.....	No
Woodruff...M	2,396	U	1.0	RPpT	No	No	1.4	I	G	½-8	½-¾	0.2	No
South Dakota													
Arlington...M	1,100	U	10.0	R	No	No	4.0	I	GL	4-8	½-2	.....	Yes
Armour...M	1,045	U	....	T	....	....	3.0	I	IL	4-6	.....	.....	Yes
Belle Fourche...M	1,660	U	9.0	R	No	No	12.0	IW	G	4-8	¾	None	...
Britton...M	1,105	U	0.0	RT	No	No	0.7	I	GI	3-5	.....	.....	No
Deadwood...M	2,403	S	3.0	R	No	No	12.0	WrI	I	4-10	½-1	None	No
De Smet...M	1,035	U	0.5	Pp	.....	.....	2.0	I	L	4-8	¾	0.9	No
Edgemont...M	1,200	U	0.0	R	No	No	20.0	I	I	8	6	None	No
Elk Point...M	1,500	U	0.1	R	....	.....	1.5	I	L	4-8	⅝	0.5	...
Elkton...M	742	U	0.0	RT	A	.....	2.8	I	G	4-8	.....	.....	No
Flandreau...M	1,929	S	0.5	RT	No	No	8.0	I	GL	4-10	.....	1.0	Yes
Fort Pierre...M	1,000	S	0.2	RT	No	No	5.0	I	L	4-8	.....	0.4	Yes
Gettysburg...M	1,000	U	0.0	RT	No	No	3.0	I	L	4-6	¾	0.1	No
Groton...M	1,273	U	0.1	RT	No	No	1.5	I	L	4-8	.....	1.4	No
Hot Springs...P	2,300	U	0.5	R	No	No	6.0	I	G	4-10	½-¾	.....	No
Ipswich...M	810	U	0.0	RPp	.....	.....	3.5	I	IG	4-8	1½	0.5	...
Lake Preston...M	1,007	U	....	R	No	No	4.5	I	L	4-6	¾	0.4	No
Lemmon...M	1,126	U	0.0	RPp	No	No	3.0	I	G	4-8	.....	.....	No
Lennox...M	1,100	U	0.0	T	No	No	3.5	I	G	4-6	4-6	.....	No
Millbank...M	2,215	U	0.1	Pp	No	No	3.0	I	G	4-10	.....	0.2	...
Parkston...M	1,400	U	0.2	RT	No	No	5.8	I	L	4-8	.....	0.3	No
Pierre...M	3,209	U	2.5	R	No	No	10.0	I	G	4-10	.....	1.0	Yes
Romona...	400	U	0.0	.....	.....	.....	1.0	I	.....	4-6	.....	0.01	No
Tyndall...M	1,107	U	....	R	.....	.....	3.0	I	L	4-8	.....	0.2	No
Webster...M	1,800	U	0.3	RPp	No	No	4.0	I	G	4-8	.....	0.1	No
Tennessee													
Bells...P	1,200	U	0.5	Pp	No	No	....	I	G	3-4	.....	0.1	No
Centreville...P	1,000	U	0.5	T	No	No	2.0	.....	I	2	¾	.....	No
Clinton...P	2,462	U	1.0	None	No	No	4.0	I	.....	1½-6	.....	None	No
Cookeville...M	2,395	S	4.5	RT	No	.....	6.0	I	.....	4-10	.....	1.2	Yes
Covington...M	3,410	U	0.1	R	.....	.....	7.0	I	G	2-8	.....	2.09	...
Dresden...M	.....	U	0.5	RPp	No	No	3.0	I	G	4-8	.....	1.6	No
Elizabethton...P	2,749	U	5.0	R	....	....	9.0	I	G	4-14	½	.....	...
Fayetteville...M	3,900	U	4.0	R	No	Ch	15.0	I	G	2-10	½-1	.....	No
Franklin...M	4,000	U	12.0	RT	No	No	20.0	I	G	2-10	.....	None	No
Gallatin...M	2,757	S	3.0	Pp	A	.....	10.0	I	G	4-8	.....	1.08	No
Halls...P	2,000	U	0.0	T	No	No	1.5	I	G	4-6	.....	0.2	No
Henderson...M	2,276	U	....	T	No	No	5.5	I	G	4-8	¾	0.1	No
Humboldt...M	3,913	U	0.1	R	No	No	4.0	I	G	4-10	¾-2	0.8	...
Huntingdon...M	1,600	U	0.1	R	No	No	4.0	.....	G	1-8	¾	1.0	No
Jellico...M	3,000	U	0.3	R	No	.....	6.5	I	G	6-10	½-2	0.8	No
Lawrenceburg...M	2,461	U	0.5	R	.....	.....	7.0	.....	I	6-10	.....	1.0	...
Lewisburg...M	2,711	SU	4.0	RPp	.....	.....	8.0	I	G	6-8	.....	.....	...
Lexington...M	2,000	U	0.3	RPp	No	No	3.5	I	G	4-10	½-¾	1.2	No
McKenzie...M	1,322	U	0.0	RPp	.....	.....	9.5	I	G	4-8	.....	.....	...
Newbern...M	3,311	U	....	RT	No	No	4.0	I	.....	4-8	.....	.....	No
Obion...M	1,733	U	....	RPp	No	No	2.0	.....	G	4-8	.....	0.6	No
Paris...M	4,730	U	0.4	RPp	No	No	10.0	I	G	4-10	.....	3.0	...
Ripley...P	3,500	U	0.1	R	No	No	10.0	I St	G	1¼-12	½-2	0.9	...
Rockwood...M	4,651	U	3.0	R	.....	Ch	3.5	I	G	4-10	.....	1.0	Yes
Shelbyville...P	3,500	S	0.1	Pp	O	Ch	4.5	I	G	4-8	½-1	0.5	...
Somerville...M	1,387	U	0.3	T	No	No	2.0	I	.....	2-6	¾	0.5	No
Tellico Plains...P	1,460	U	0.5	T	No	No	1.0	.....	Wr	1½-4	.....	0.2	No
Trenton...M	2,751	U	0.2	R	No	No	3.5	I	G	4-8	½-1½	4.8	No
Tullahoma...M	3,479	U	0.0	RPp	.....	.....	7.5	I	G	4-8	.....	0.7	...
Texas													
Anson...M	2,500	SU	1.0	Pp	No	No	4.0	I	G	4-6	.....	0.5	No
Arlington...M	3,031	U	0.8	RPpT	No	No	11.5	I	I	4-10	¾	0.5	No
Athens...M	3,176	U	0.3	RT	No	No	5.0	I	G	4-8	2	.....	No
Atlanta...M	2,000	U	0.0	T	No	No	5.0	I	G	6-8	½-1	0.2	No
Balfinger...M	2,767	S	0.5	Pp	F	No	14.0	I St	Wr	2-8	.....	.....	No
Bartlett...M	1,815	U	....	R	.....	.....	7.0	I St	.....	1-6	.....	.....	No
Bastrop...P	1,707	U	0.5	Pp	No	.....	3.5	I	G	4-8	.....	0.5	No
Calvert...P	2,099	U	0.4	PRp	No	No	7.5	I	G	2-8	½-1¼	2.0	Yes
Cameron...P	4,298	S	1.0	RPp	No	Ch	6.0	I	G	4-8	.....	1.0	No
Canadian...M	2,187	U	0.1	RPp	No	.....	7.0	I	G	2-6	.....	0.6	...
Carthage...M	1,500	U	....	RT	No	No	0.8	I	G	4-8	.....	0.1	No
Chillicothe...M	1,500	U	0.5	T	No	No	7.0	I	G	¾-2	¾	1.8	No
Clarendon...M	2,456	U	0.1	RPp	O	.....	12.0	I	G	4-8	.....	0.1	No
Cooper...M	2,563	S	2.0	T	A	No	8.0	IG	G	6-8	½-2	0.7	No
Cotulla...M	2,500	U	0.0	None	No	No	4.0	I	.....	2½-4	.....	.....	No
Crockett...M	3,061	U	0.2	R	.....	.....	....	.....	.....	.....	.....	0.3	Yes

Consumption		Number of Services		Number of Meters		Per Cent Metered		Meter Rates per 1,000 Gallons		Meters Owned by	Hydrants			Average Pressure lbs per sq. in.	
Average Daily in 1,000 gals.	Per Capita	Domestic	Industrial	Domestic	Industrial	Domestic	Industrial	Max. Dom.	Min. Ind.		Number	Owned by	Aver. Rental each per year	Domestic	Fire
60	29	169	1	166	.....	100	100	33¢	7.5¢	M	58	M	None	58	100
200	84	180	4	98	4	54	100	45¢	33¢	M	50	M	.....	43	85
.....	.....	.....	.....	.....	.....	.....	100	40¢	40¢	M	17	M	.....	60	90
50	48	200	25	200	25	100	100	60¢	60¢	H	24	M	.....	65	150
.....	.....	200	5	0	0	0	0	.....	.....	.....	36	M	.....	65	157
50	45	.....	.....	.....	.....	.....	.....	.....	.....	.....	15	M	.....	112	112
450	187	688	.....	55	.....	8	.....	.....	.....	.....	78	M	.....	80	80
12	12	115	.....	100	.....	87	.....	50¢	.....	M	54	M	.....	73	75
Unknown	.....	300	90	0	0	0	0	.....	.....	.....	.....	M	None	45	55
30	20	55	.....	.....	.....	.....	.....	.....	.....	.....	24	.....	.....	57	57
50	67	117	1	0	0	0	0	.....	.....	.....	19	M	.....	40	40
100	52	525	3	.....	7	.....	100	20¢	15¢	H	68	M	None	45	125
80	80	75	30	0	.....	.....	.....	.....	.....	.....	42	M	.....	83	87
18	18	75	21	75	21	100	100	75¢	75¢	H	26	M	.....	50	50
80	63	250	55	250	55	100	100	25¢	25¢	M	34	M	.....	60	60
450	195	362	.....	47	.....	1	.....	30¢	10¢	P	57	P	$25	100	125
80	99	225	.....	225	.....	100	.....	81¢	.....	H	40	M	.....	43	125
Unknown	.....	200	.....	.....	.....	90	.....	$1.00	60¢	M	47	M	.....	40	80
Unknown	.....	170	20	160	20	94	100	60¢	40¢	H	36	M	None	60	60
12	11	.....	.....	95	.....	.....	.....	$2.25	.....	.....	25	M	None	.....	55
80	36	180	.....	200	.....	100	.....	.....	.....	.....	44	.....	.....	60	60
60	43	135	5	135	5	100	100	45¢	22¢	H	32	M	None	45	60
550	171	800	12	300	12	38	.....	75¢	$1.13	M	97	M	.....	73	73
Unknown	.....	.....	.....	.....	.....	100	100	2¢	.....	H	8	.....	.....	85	100
Unknown	.....	217	.....	217	.....	100	.....	35¢	.....	H	52	.....	.....	40	50
80	44	165	.....	160	.....	97	.....	50¢	50¢	M	36	M	$35	60	60
12	10	.....	.....	.....	.....	.....	.....	.....	75¢	P	12	M	$24	38	.....
15	15	60	.....	0	.....	0	.....	.....	.....	.....	.....	.....	.....	55	.....
Unknown	.....	200	25	0	0	0	0	.....	.....	.....	5	P	Free	25	25
.....	.....	150	10	150	10	100	100	.....	50¢	H	75	M	.....	70	70
500	147	700	.....	78	.....	11	.....	30¢	.....	M	55	M	.....	50	125
40	.....	150	40	12	7	8	18	30¢	30¢	H	40	M	Free	35	90
.....	.....	850	.....	0	0	0	0	.....	.....	.....	50	P	.....	100	125
400	103	800	.....	40	.....	5	.....	80¢	16¢	H	62	M	None	73	73
100	25	640	.....	610	.....	95	.....	50¢	10¢	M	50¢	M	.....	52	52
250	91	500	.....	300	.....	60	.....	.....	.....	M	58	M	None	60	125
100	40	76	27	0	4	0	15	15¢	15¢	H	32	M	$30	43	80
60	26	140	.....	140	.....	100	.....	33¢	.....	M	44	M	None	40	65
300	77	800	.....	26	.....	3	.....	20¢	8¢	M	43	M	.....	50	85
120	75	240	5	0	0	0	0	20¢	20¢	.....	40	M	.....	60	100
150	50	475	10	380	10	80	100	40¢	5¢	M	79	M	$25	65	65
175	71	650	.....	100	.....	15	.....	20¢	20¢	M	70	.....	.....	55	55
250	92	700	.....	600	.....	86	.....	25¢	.....	M	60	.....	.....	60	60
100	50	300	25	5	20	17	80	50¢	25¢	M	46	M	.....	45	125
110	83	350	.....	200	.....	57	.....	30¢	16¢	M	42	M	.....	55	110
75	23	300	25	290	25	97	100	33¢	13¢	.....	51	M	.....	35	90
75	43	171	16	0	8	0	50	43¢	43¢	M	16	M	.....	40	100
500	106	1,150	.....	50	25	4	.....	25¢	17¢	H	64	M	.....	40	125
450	129	500	25	0	4	0	16	.....	25¢	.....	50	M	.....	80	110
500	107	900	10	700	10	78	100	25¢	10¢	M	50	M	.....	65	90
175	50	.....	.....	.....	70	.....	.....	.....	.....	.....	48	P	.....	50	110
60	43	175	6	150	6	86	100	30¢	15¢	M	25	M	.....	70	.....
30	21	126	.....	0	.....	0	.....	.....	.....	.....	7	M	None	72	82
586	213	600	25	0	0	0	0	.....	.....	.....	49	M	$37.50	60	125
250	72	650	10	.....	.....	.....	.....	.....	15¢	M	85	M	.....	40	100
150	60	200	20	200	20	100	100	.....	.....	M	28	M	None	60	120
240	79	900	.....	800	.....	89	.....	40¢	25¢	M	78	M	.....	60	90
220	70	500	30	350	30	70	100	50¢	20¢	M	45	M	.....	51	85
70	35	200	3	175	3	88	100	31¢	15¢	M	50	M	None	50	100
250	90	650	110	600	50	92	45	20¢	12.5¢	M	50	M	None	60	100
Unknown	.....	285	8	200	8	70	100	12½¢	20¢	M	30	M	.....	40	.....
.....	.....	200	.....	200	.....	100	.....	40¢	20¢	P	18	.....	$50	40	75
100	48	317	.....	317	.....	100	.....	60¢	25¢	P	25	P	.....	40	125
500	116	800	.....	400	.....	50	.....	.....	.....	.....	55	.....	.....	50	50
200	91	500	.....	500	.....	100	.....	.....	.....	M	37	M	.....	70	70
20	13	85	10	.....	8	40	80	50¢	25¢	M	15	M	.....	45	88
75	50	200	25	200	25	100	100	75¢	20¢	M	27	M	.....	43	43
75	31	390	.....	361	.....	93	.....	.....	.....	M	52	M	None	65	125
150	59	450	8	300	8	67	100	$1.00	30¢	M	50	M	.....	50	60
Unknown	.....	400	.....	0	.....	0	.....	.....	.....	.....	.....	.....	.....	.....	.....
100	33	.....	.....	.....	.....	.....	.....	25¢	18¢	.....	.....	.....	.....	65	65

Municipality Ownership of Water works	Population	Source Type	Source Aver. Miles from City	Storage	Filters	Sterilized	Distribution System Total Miles of Main	Distribution System Kind of Pipe Mains	Distribution System Kind of Pipe Services	Pipe Sizes Inches Mains	Pipe Sizes Inches Services	Pump Capacity m. g. d.	Main Supply Metered
TEXAS (Con.)													
Crosbyton....M	1,100	U	0.3	RPp	No	No	1.1	I	Wr	2-6	¾-1	0.1	No
Dublin....M	3,229	U	0.0	RPp	.....	.....	7.0	I	G	4-8	.....	0.2	No
Eagle Lake....P	2,017	U	0.3	Pp	.....	.....	6.0	I	.....	4-8	.....	0.2	No
Elgin....M	3,000	U	4.5	RPp	.....	.....	8.5	IW St	G	4-8	½-¾	0.2	...
Forney....P	1,500	U	0.0	RT	No	No	8.0	I	G	2-8	¾	0.3	No
Fowlerton....P	200	U	0.3	None	No	No	2.0	Ri	I	6	½	None	No
Franklin....P	1,500	U	....	T	.....	.....	....	Wr	Wr	1¼-6	.....	.....	No
Freeport....P	2,000	U	0.0	T	No	No	8.4	I St	G	¾-8	¾	0.2	No
Garland....M	2,000	U	0.0	RT	No	No	6.0	I St	G	8	.....	1.2	No
Gatesville....M	2,499	U	0.3	RPpT	No	No	2.0	I	G	3-6	.....	0.7	No
Georgetown....M	2,871	U	0.3	RPp	....	Ch	8.0	I	Wr	2-8	¾-2	4.0	No
Giddings....P	1,535	U	0.5	RPp	No	No	....	I	G	4	¾	0.7	No
Goldthwaite....M	1,235	U	0.5	T	No	No	6.0	I	G	2-8	¾	0.1	No
Goliad....P	2,025	U	....	RPp	No	No	3.0	.....	G	4-8	.....	1.3	No
Graham....M	4,500	S	0.5	RPpT	A	Ch Hy	14.0	I	G	2-10	2	1.44	No
Granbury....M	1,350	U	0.5	RT	No	No	4.4	I St	G	2-8	¾-2	0.2	No
Hallettsville....M	1,379	U	0.4	RPp	No	No	3.0	I	G	4-8	½-2	0.5	No
Hearne....M	2,741	U	0.0	RT	No	No	3.0	I	G	4-8	¾-1	0.6	No
Henrietta....M	3,000	SU	1.5	RPp	No	No	10.0	I	G	4-12	¾-2	0.5	No
Hereford....M	2,472	U	0.0	RT	No	No	3.0	I	.....	4-8	.....	1.1	No
Italy....P	1,450	U	0.5	RT	No	Ch	7.0	I	LG	2-8	¾	0.3	No
Itasca....M	1,599	U	0.0	RPp	No	.....	3.0	I	.....	4-8	.....	0.5	No
Jefferson....M	2,549	SU	....	RPp	.....	.....	10.0	I	.....	4-8	.....	0.3	...
Kenedy....M	2,015	U	0.8	RPpT	No	No	3.5	I St	.....	2-8	.....	0.1	...
Ladonia....M	1,293	U	0.1	RPpT	.....	.....	4.0	I	G	4-8	1¼	0.3	No
Lampasas....M	3,500	S	....	Pp	.....	.....	10.0	.....	G	3-8	.....	1.0	...
Lancaster....M	1,195	U	0.3	RPpT	No	No	2.0	I	G	4-8	½-2	0.2	No
Livingston....M	1,500	U	0.0	RT	No	No	6.0	St	I	4-8	2	0.1	No
Llano....P	1,687	S	0.1	RPp	No	Hy	5.0	I	GI	2-8	½-1	1.7	No
Lockhart....P	3,731	U	0.1	Pp	.....	Ch	12.0	I	G	4-8	.....	.....	...
Lockney....M	.....	....	0.0	RT	No	.....	2.0	.....	G	6	¾	.....	No
McGregor....P	2,081	U	0.5	RPp	No	No	6.0	St	G	2-6	.....	0.3	...
Marble Falls....P	1,061	S	0.3	R	No	No	3.5	.....	I	1¼-4	.....	.....	No
Mart....M	3,105	S	5.8	T	A	....	....	.....	I	4-8	½-1¾	2.6	No
Memphis....P	3,500	U	6.0	R	No	No	30.0	I St	G	1½-8	¾	0.3	No
Meridian....M	1,200	U	0.0	RPp	....	....	4.5	I	.....	2-8	.....	0.1	...
Midlothian....M	1,000	U	0.1	RPp	No	No	1.5	Wr	Wr	4-6	¾	0.1	No
Miles....M	1,200	U	0.3	RPpT	No	....	4.0	I St	G	1-6	½-¾	.....	No
Mt. Pleasant....M	4,099	S	2.0	Pp	No	No	....	.....	G	4-8	.....	.....	Yes
Palacios....M	1,500	U	0.0	RT	.....	.....	4.0	I	G	4-8	¾	0.7	No
Pecos....M	1,818	U	0.0	Pp	.....	.....	1.0	I	G	8	.....	0.2	No
Plano....M	.....	SU	0.8	RPp	No	No	5.0	I	G	4-8	¾	0.8	Yes
Post....P	1,642	U	4.3	R	No	Hy	14.4	I St	G	4-10	½-2	.....	No
Robstown....M	2,000	S	6.0	RT	A	Ch	7.5	I	G	8	2	2.0	No
Rockdale....M	2,323	U	0.2	RPp	.....	.....	2.5	I	Wr	4-8	.....	.....	No
Rogers....P	1,500	S	1.0	RPpT	No	No	10.0	I	G	2-8	.....	.....	No
Roscoe....M	1,600	U	0.0	T	No	No	3.0	I	G	6-8	2	0.1	No
Rosebud....M	1,516	S	1.8	RPpT	No	Ch	0.6	I	G	2-6	½-1¼	0.3	Yes
Royse City....M	1,500	S	0.8	Pp	No	No	3.0	I	G	2-8	¾	.....	No
Runge....M	2,000	U	0.0	RT	No	No	1.0	I	G	.....	2	0.3	No
Sabinal....M	1,640	U	1.0	RT	No	No	3.5	I	G	4-8	¾-1	0.7	No
San Saba....P	2,011	U	0.2	PpT	No	.....	5.6	I	G	1½-6	.....	0.4	No
Santa Anna....M	2,000	S	2.0	R	....	....	....	.....	G	2-6	¾	.....	...
Schulenberg....M	1,091	U	0.2	RPpT	No	No	1.21	I	I	6-8	.....	0.2	Yes
Seymour....M	3,000	U	1.0	Pp	No	No	25.0	I St	G	2-8	¾	1.0	No
Shiner....M	1,400	U	0.3	RPp	No	No	15.0	I	G	6-10	.....	0.3	No
Smithville....P	3,204	U	0.5	R	No	No	6.0	I St	Wr	4-8	.....	2.0	No
Snyder....M	2,179	U	0.0	RPp	....	....	3.0	.....	.....	4-8	.....	0.3	...
Texas City....P	4,500	U	0.5	RT	No	No	14.0	I St	G	1-12	½-¾	0.6	No
Timpson....M	2,000	U	0.1	RT	No	No	5.0	I	G	6-8	½	0.9	No
Tioga....M	900	U	0.0	R	No	No	0.3	I	G	6	¾	0.09	No
Trinity....M	.....	S	4.0	RT	.....	.....	12.0	W	G	4-10	.....	.....	Yes
Van Alstyne....M	1,441	U	0.1	T	No	....	2.5	I	G	4-6	.....	0.1	No
Walnut Springs....M	.....	U	0.0	R	No	No	4.5	I	G	4-8	¾	0.6	No
Wellington....M	3,000	U	3.0	RPp	No	Ch	5.0	I	.....	8	¾-1	0.4	No
West....P	1,645	U	0.0	RPp	No	No	12.0	I	G	2-6	½-1	0.6	No
Whiteboro....M	2,000	U	0.0	RPp	A	.....	10.0	I	G	4-8	¾	.....	No
Whitewright....M	1,666	U	0.1	RPp	No	No	....	I	.....	4-8	½-2	0.1	No
Winters....M	2,500	S	2.0	RT	No	No	7.0	I St	.....	6	½	0.5	No
Wolfe City....M	2,000	S	1.0	RPpT	No	No	2.0	I	G	2-8	2	.....	No
Clarksville....M	3,386	U	1.5	RPpT	....	....	9.0	I	G	2-4-8	½-¾-1	7.3	No
Lewisville....P	1,200	U	0.0	Pp	No	No	5.0	I St	G	¾-6	¾-1	.....	No
UTAH													
Ephraim....M	2,287	U	9.0	RPp	No	No	14.0	W	G	4-10	¾	.....	No
Farmington....M	1,200	S	2.0	R	No	.....	9.0	W	.....	2-10	¾	.....	No

Consumption		Number of Services		Number of Meters		Per Cent Metered		Meter Rates per 1,000 Gallons		Meters Owned by	Hydrants			Average Pressure lbs. per sq. in.	
Average Daily in 1,000 gals.	Per Capita	Domestic	Industrial	Domestic	Industrial	Domestic	Industrial	Max. Dom.	Min. Ind.		Number	Owned by	Aver. Rental each per year	Domestic	Fire
Unknown	.....	200	10	200	10	100	100	$1.00	45¢	M	11	M	.....	42	42
75	23	400	.....	350	.....	88	.....	75¢	.....	M	54	M	.....	50	150
150	75	325	.....	275	.....	85	.....	25¢	.....	P	27	P	.....	40	100
200	67	300	5	240	5	80	100	50¢	35¢	M	34	M	.....	45	70
100	67	300	10	150	10	50	100	50¢	35¢	P	20	M	None	45	90
Unknown	.....	100	.....	0	.....	0	.....	.....	.....	.....	68	P	.....	25	25
63	42	.....	.....	.....	.....	.....	.....	.....	.....	P	None	.....	.....	25	25
100	50	432	8	21	8	5	100	50¢	15¢	P	10	P	None	28	45
50	25	275	5	275	5	100	100	$1.00	25¢	M	35	M	None	60	100
200	80	800	.....	176	.....	22	.....	50¢	25¢	M	36	M	.....	43	100
400	140	500	6	450	6	90	100	50¢	15¢	M	62	M	None	40	120
30	19	140	.....	100	.....	71	.....	67¢	.....	.....	3	.....	$40	25	30
20	16	110	10	57	10	52	100	35¢	35¢	M	31	M	$50	65	65
50	25	125	25	65	13	52	50	50¢	30¢	P	30	.....	.....	70	100
250	56	1,068	12	1,062	12	100	100	62.5¢	20¢	M	91	M	None	65	93
.....	.....	375	25	15	7	40	28	$1.00	65¢	M	32	M	.....	65	75
85	62	300	10	150	5	50	50	50¢	25¢	MH	45	M	.....	40	100
100	36	350	10	350	10	100	100	50¢	15¢	M	60	M	None	53	120
133	44	465	.....	350	.....	75	100	50¢	15¢	M	31	M	None	50	50
40	16	340	1	280	1	77	100	50¢	7¢	.....	25	M	.....	50	50
100	69	300	3	150	3	50	100	50¢	30¢	PH	16	P	$36	50	75
85	14	.....	3	314	2	75	66	75¢	37.5¢	M	35	M	.....	40	275
50	20	160	.....	90	.....	56	.....	33.3¢	33.3¢	M	45	M	.....	90	120
50	25	368	.....	367	.....	100	100	70¢	35¢	M	33	M	.....	74	74
25	19	108	.....	10	.....	10	.....	$1.00	18¢	M	32	M	.....	40	85
75	21	147	.....	450	.....	100	.....	25¢	25¢	M	59	M	.....	65	150
50	42	200	.....	12	.....	6	.....	.....	40¢	M	12	.....	.....	55	150
40	27	175	27	175	27	100	100	75¢	35¢	H	23	M	.....	76	110
300	178	350	. .	340	.....	97	.....	66.7¢	66.7¢	PH	23	P	$30	75	100
300	81	511	.....	505	.....	99	.....	50¢	15¢	P	51	.....	$35	23	113
20	.....	66	.....	50	.....	76	.....	50¢	.....	M	14	M	None	54	54
100	48	650	.....	200	.....	31	.....	67.5¢	33.3¢	P	12	M	$25	40	40
100	94	150	0	0	0	0	0	.....	.....	.....	0	.....	.....	10	.....
300	97	600	30	580	30	96	100	75¢	25¢	M	47	M	.....	45	90
300	86	675	35	675	35	100	100	50¢	30¢	P	33	P	.....	110	110
20	17	200	.....	.....	.....	.....	.....	.....	.....	.....	15	M	.....	45	.....
50	50	200	7	150	7	75	100	75¢	75¢	M	6	M	None	40	100
25	21	75	50	50	0	67	0	50¢	25¢	M	8	M	$18	.....	43
100	24	475	.....	475	.....	100	.....	50¢	12.5¢	M	60	M	None	70	120
125	83	275	25	10	25	4	100	17¢	15¢	M	40	M	.....	55	55
Unknown	.....	72	.....	70	.....	97	. . .	80¢	30¢	M	8	M	.....	40	60
35	.....	250	5	200	5	80	100	75¢	50¢	M	32	M	None	35	90
123	75	405	103	405	103	100	100	$1.25	25¢	P	34	P	$50	100	100
140	70	420	25	250	25	60	100	$1.00	25¢	M	28	M	None	45	45
150	65	400	5	200	5	50	100	$1.00	9¢	M	40	M	None	50	110
50	33	300	2	350	.....	100	.....	50¢	25¢	H	20	M	.....	50	75
12	75	60	5	50	5	83	100	25¢	25¢	M	24	M	None	30	40
40	26	425	7	400	6	94	86	50¢	25¢	M	41	M	None	40	125
150	100	200	60	200	60	100	100	60¢	25¢	M	56	M	.....	45	.....
Unknown	.....	250	25	150	25	60	100	.....	.....	M	20	.....	.....	60	120
75	46	250	0	0	0	0	0	.....	.....	.....	30	M	None	55	55
100	50	250	.....	85	.....	34	.....	50¢	20¢	P	12	P	$40	50	100
.....	.....	450	.....	450	.....	100	.....	62.5¢	25¢	M	.....	.....	.....	92	.....
.....	.....	100	.....	12	.....	12	.....	40¢	.....	.....	24	M	.....	42	80
150	50	390	60	390	60	100	100	33.3¢	33.3¢	M	36	M	.....	40	165
40	29	153	6	46	6	30	100	63¢	25¢	M	66	M	.....	.....	40
500	156	600	.....	580	.....	95	75	30¢	15¢	P	30	P	$40	60	113
50	23	.....	.....	225	.....	.....	.....	30¢	20¢	M	38	M	.....	60	60
90	20	540	1	500	0	93	0	25¢	20¢	P	25	P	$36	50	50
50	25	100	25	75	15	75	60	20¢	62.5¢	H	30	M	.....	50	50
10	11	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	M	None	40	70
75	.....	150	50	50	10	30	20	15¢	15¢	M	26	M	.....	.....	45
60	42	300	.....	200	.....	66	100	75¢	40¢	M	43	M	.....	40	125
30	.....	158	2	78	2	49	100	75¢	35¢	M	.....	M	.....	45	45
.....	.....	305	.....	250	.....	82	.....	50¢	50¢	M	33	M	None	65	70
100	61	500	.....	60	.....	12	.....	75¢	.....	P	20	P	None	50	100
125	63	525	.....	525	.....	100	.....	75¢	25¢	M	40	M	.....	50	.....
60	36	450	15	425	15	95	100	$1.20	45¢	H	32	M	.....	60	70
500	200	460	8	420	2	91	25	25¢	20¢	.....	35	M	.....	50	100
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	32	M	None	40	80
100	30	600	8	445	8	67	100	$1.50	50¢	M	68	M	.....	55	.....
20	17	200	2	25	2	10	100	40¢	40¢	P	2	P	None	45	45
50	22	550	2	0	2	0	100	.....	15¢	H	45	M	.....	75	75
Unknown	.....	234	2	.....	.....	.....	.....	.....	6.5¢	.....	33	M	.....	65	65

Municipality Ownership of Water works	Population	Source Type	Source Aver. Miles from City	Storage	Filters	Sterilized	Distribution System Total Miles of Main	Distribution System Kind of Pipe Mains	Distribution System Kind of Pipe Services	Pipe Sizes Inches Mains	Pipe Sizes Inches Services	Pump Capacity m. g. d.	Main Supply Metered
UTAH (Con.)													
Garland M	1,000	S	6.0	.....	No	No	10.0	IW	I	2–6	1½–¾	.....	...
Gunnison M	1,500	....	10.0	R	No	No	12.0	W	.....	2	1½	.....	...
Lehi M	3,500	U	10.0	R	No	No	21 0	IW St V	G	2–12	½	None	No
Lewiston City M	1,600	U	6.0	R	No	No	39.3	W St	G	2–12	1½–¾	None	No
Manti M	2,412	U	2.0	R	.....	.....	14.0	I St	G	1–8	½	.....	No
Midvale M	2,209	S	8.0	R	.....	.....	10.0	IW	IW	2–12	¾	None	No
Mt. Pleasant M	2,415	U	7.0	R	.....	.....	18.0	IW	IW	3–12	.....	.....	No
Murray M	4,584	U	6.0	R	No	No	25.0	IW C St	G Wr	4–12	½–1	None	No
Payson M	3,031	U	5.0	R	.....	.....	8.0	W St	G	2–12	.....	.....	No
Pleasant Grove M	2,300	U	3.0	RPp	No	No	18.0	IWG	G	1–8	¾	None	Yes
Price M	4,000	U	25.0	R	No	No	12.0	IW St	G	2–12	¾–6	None	No
Richmond M	1,500	U	5.0	R	No	No	6.0	IW	G	2–12	¾	.....	No
St. George M	2,800	S	20.0	R	No	No	20.0	WC	G	2	.....	None	No
Salina M	1,451	U	7.0	R	.....	.....	.....	.....	W	2–10	.....	.....	No
Smithfield M	2,500	U	2.0	R	No	.....	12.0	I	I	1½–16	½–2	.....	...
Tooele M	3,602	U	2.0	R	.....	.....	11.0	W	G	2½–10	.....	.....	No
VERMONT													
Barnet P	1,685	U	2.5	R	No	No	....	G	.....	1–3	.....	None	...
Barton M	1,200	S	1.3	R	.....	.....	5.5	I	G	4–12	.....	.....	...
Bellows Falls M	4,860	S	1.5	R	No	No	15.0	.....	BLI	4–20	½–1	.....	No
Brandon M	2,874	S	....	R	.....	.....	16.0	I	G	4–16	.....	.....	No
Brighton M	2,200	S	2.0	R	.....	.....	16.0	I	G	4–10	½–1	.....	...
Cambridge M	1,593	U	5.0	R	.....	.....	5.0	I	I	4–8	.....	.....	No
Chelsea P	1,087	U	....	R	No	No	3.0	St	.....	½–2	½	None	No
Fairhaven M	2,182	S	3.5	.....	.....	.....	15.0	I	Wr	2–10	¾	.....	No
Hardwick M	2,641	S	0.8	R	No	No	19.0	I	I	4–10	.....	0.2	No
Hartford P	600	U	2.0	R	No	.....	5.0	Wr	G	½–2	.....	.....	No
Hyde Park M	1,323	U	4.0	R	.....	.....	3.0	I	G	6–12	.....	.....	No
Ludlow M	2,421	U	2.3	R	.....	.....	8.0	I	G	4–12	.....	.....	...
Manchester Center P	2,000	U	2.0	R	No	No	14.0	I Wr	G	2–10	½–1½	.....	No
Marshfield M	1,032	U	1.0	R	O	No	1.5	St	G	1¼	.....	.....	No
Newport M	4,976	S	5.5	R	No	No	15.0	I Wr	G Wr	4–16	½–2	.....	Yes
Northfield M	3,096	U	....	R	.....	.....	15.5	.....	I	6–12	.....	.....	No
Pittsford P	2,098	U	6.0	R	.....	.....	6.0	I	G	4–6	.....	.....	...
Poultney M	2,868	S	3.0	Pp	.....	.....	5.0	I	G	4–10	.....	.....	...
Richford M	2,842	SU	3.0	R	O	.....	10.0	I	G	4–10	½–¾	.....	No
Swanton M	3,343	S	9.0	R	No	No	10.0	IW	.....	10–12	1–1¼	None	...
Underhill P	1,140	U	1.5	R	....	.....	3.0	I	.....	¾–3	.....	.....	...
Vergennes M	1,753	S	0.0	.....	No	.....	8.0	I	Wr	4–6	.....	1.25	No
Wallingford P	1,588	U	1.0	R	No	No	2.0	I	G	6–8	.....	None	...
Westminster P	1,289	U	0.5	R	.....	.....	1.0	I	.....	2–4	.....	.....	...
West Rutland P	3,391	U	2.0	R	.....	.....	13.0	I	.....	6–12	.....	.....	...
White River Jct P	2,625	S	3.0	R	O	No	9.0	I	G	4–10	.....	0.3	No
Wilmington M	1,483	SU	5.0	R	.....	.....	2.0	I	G	4–8	.....	.....	...
Windsor M	3,061	U	0.3	RPp	.....	.....	6.0	I	G	2–8	.....	1.4	...
Woodstock P	2,370	SU	2.5	R	.....	.....	8.5	I	G	4–8	¾	None	No
VIRGINIA													
Appalachia P	3,000	S	2.0	R	O	No	10.0	I	G	3–8	½–2	None	Yes
Ashland M	1,500	S	4.0	T	A	Ch	5.5	I	G	2–8	¾–1	0.7	No
Berryville M	876	U	9.0	R	No	No	4.0	I	.....	4–8	.....	0.1	No
Big Stone Gap M	3,600	S	7.0	R	No	No	7.0	I	G	4–12	¾–2	None	No
Blackstone M	1,855	U	2.0	RPpT	.....	No	6.0	I	GL	.....	.....	0.3	No
Buchanan P	899	SU	2.0	RPp	.....	.....	1.8	.....	.....	4–8	.....	0.2	...
Castlewood P	500	U	3.0	None	No	No	4.0	I	G	1–2	½	None	No
Crewe M	2,097	U	0.5	R	No	.....	3.0	I	.....	4–6	.....	0.2	No
Culpeper M	2,362	S	3.0	Pp	A	Ch	7.0	TC	.....	4–10	¾	1.3	No
Emporia M	2,018	S	2.5	T	A	Ch	6.0	I	G	4–8	½–1	1.3	No
Farmville M	2,586	S	1.0	Pp	A	Ch	9.0	I	G	2–8	.....	1.9	No
Front Royal M	3,000	S	3.0	R	A	Hy	8.0	I	G	4–10	.....	.....	...
Galax M	2,500	S	1.0	R	A	Hy	5.0	I	.....	4–8	½–2	1.0	Yes
Lawrenceville M	2,500	S	1.0	RPpT	A	Ch	4.0	I	G	1½–8	¾	1.1	No
Lexington M	2,870	U	13.0	R	.....	.....	28.0	I	Wr	3–8	.....	.....	No
Manassas M	1,217	U	0.1	RT	No	No	7.0	I	G	2–8	¾–2	0.3	Yes
Salem M	4,159	SU	0.5	RPp	.....	Ch	18.8	I	G	2–10	½–2	1.2	No
Saltville P	2,500	U	1.0	R	No	Ch	7.65	I Wr	G	3½–12	½–1	0.40	No
Shenandoah M	2,000	S	0.0	S	O	Hy	3.0	I	G	8	¾	.....	No
Smithfield P	1,278	U	2.0	RPpT	No	No	8.0	I	.....	6–8	4	7.5	No
Woodstock M	1,650	U	3.8	R	.....	.....	5.3	I	G	4–8	.....	.....	No
WASHINGTON													
Blaine P	2,254	U	3.0	R	No	.....	12.0	IW	G	2–12	½–6	None	No
Buckley M	1,280	U	4.0	R	No	No	7.0	W St	.....	4–12	.....	.....	...
Burton P	1,000	U	1.5	Pp	No	No	4.5	.....	WG	½–6	½–1	.....	No
Camas M	2,800	S	9.0	R	.....	.....	12.0	IWG	G	1–8	½–1	None	No
Cashmere M	1,200	U	0.5	R	No	.....	7.0	IW	G	4–8	½–2	2.4	Yes
Castle Rock P	998	S	3.0	R	No	Ch	4.0	St	G	2–8	½–¾	.....	No

Consumption		Number of Services		Number of Meters		Per Cent Metered		Meter Rates per 1,000 Gallons		Meters Owned by	Hydrants			Average Pressure lbs. per sq. in.	
Average Daily in 1,000 gals.	Per Capita	Domestic	Industrial	Domestic	Industrial	Domestic	Industrial	Max. Dom.	Min. Ind.		Number	Owned by	Aver. Rental each per year	Domestic	Fire
.....	.....	210	.....	.....	.....	.....	.....	26.7¢	26.7¢	.....	24	M	.....	60	.....
.....	.....	300	.....	.....	.....	.....	.....	.....	.....	.....	8	.....	.....	.....	.....
300	86	293	3	4	7	1	100	15¢	15¢	M	37	M	None	90	90
200	125	240	.....	0	0	0	0	.....	.....	.....	7	M	$15	60	90
100	42	472	7	218	2	46	29	15¢	15¢	H	8	M	.....	70	70
400	180	468	.....	7	.....	1	.....	10¢	10¢	M	44	M	.....	104	120
200	83	500	60	.....	.....	.....	.....	25¢	15¢	.....	15	M	.....	40	95
1300	284	680	6	2	4	.....	67	10¢	10¢	M	113	M	.....	45	113
.....	.....	576	.....	60	.....	10	.....	10¢	10¢	H	38	M	.....	110	110
500	218	375	2	18	1	5	50	12.5¢	8¢	M	13	M	.....	50	50
2,000	500	800	15	800	15	100	100	30¢	14¢	M	60	M	None	63	63
200	133	275	10	.....	.....	.....	.....	.....	.....	.....	9	M	.....	85	.....
Unknown	.....	345	.....	136	.....	39	.....	20¢	.....	M	13	M	Free	80	.....
108	74	200	.....	10	.....	5	.....	25¢	25¢	M	7	M	.....	60	.....
75	30	613	5	0	1	.....	20	.....	10¢	M	36	M	.....	.....	68
265	74	880	.....	54	.....	6	.....	15¢	25¢	H	102	M	None	84	84
.....	.....	150	0	0	0	0	0	.....	.....	P	1	P	.....	50	100
.....	.....	250	.....	.....	.....	.....	.....	.....	.....	.....	34	.....	.....	138	138
.....	.....	784	25	600	25	77	100	15¢	15¢	M	87	M	None	100	160
300	105	550	5	0	0	.....	.....	.....	.....	.....	56	M	.....	40	135
400	182	450	2	0	0	.....	.....	.....	.....	.....	54	M	.....	93	93
.....	.....	80	.....	.....	.....	.....	.....	.....	.....	.....	18	M	.....	90	93
.....	.....	70	0	15	0	21	0	.....	.....	.....	.....	.....	.....	.....	.....
50	23	500	7	.....	4	.....	57	25¢	10¢	M	42	M	.....	.....	90
Unknown	.....	600	.....	0	0	0	0	.....	.....	.....	26	M	None	125	125
8	13	90	.....	36	.....	40	.....	33.3¢	.....	P	0	.....	.....	70	.....
Unknown	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	16	M	.....	85	85
.....	.....	390	.....	.....	3	.....	.....	.....	.....	.....	34	.....	.....	.....	120
Unknown	.....	478	5	370	4	78	80	30¢	8¢	P	59	P	$25	108	108
Unknown	.....	75	.....	.....	.....	.....	.....	.....	.....	.....	0	.....	.....	140	.....
264	53	500	75	100	50	20	67	20¢	10¢	M	70	M	.....	100	100
Unknown	.....	450	.....	270	.....	60	.....	37.3¢	13.3¢	M	84	.....	.....	127	127
15	7	250	.....	215	.....	86	.....	.....	.....	P	23	P	.....	85	85
.....	.....	250	.....	.....	15	.....	.....	.....	.....	.....	50	.....	.....	120	120
100	35	325	1	.....	1	.....	100	20¢	5¢	M	40	M	.....	110	115
200	60	.....	.....	.....	.....	.....	.....	.....	.....	.....	39	M	.....	50	70
.....	.....	50	.....	.....	.....	.....	.....	.....	.....	.....	0	.....	.....	75	75
Unknown	.....	480	.....	.....	.....	.....	.....	.....	.....	.....	37	M	.....	80	130
.....	.....	150	.....	0	.....	.....	.....	.....	.....	.....	25	P	.....	80	100
.....	.....	34	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	30
.....	.....	549	.....	0	.....	0	.....	.....	.....	.....	30	P	$16	110	110
200	76	600	.....	70	14	12	.....	25¢	6¢	P	54	P	.....	140	140
.....	.....	125	3	0	0	0	0	.....	.....	.....	17	.....	.....	.....	100
375	123	400	.....	.....	20	.....	.....	.....	.....	.....	54	.....	.....	80	80
Unknown	.....	495	.....	.....	.....	.....	.....	.....	.....	.....	36	P	$30	110	110
600	200	750	100	750	100	100	100	25¢	25¢	P	58	P	$30	120	120
100	67	290	10	290	10	100	100	50¢	25¢	M	50	M	None	40	40
Unknown	.....	.....	.....	.....	.....	.....	.....	15¢	10¢	M	38	M	.....	100	100
100	28	700	6	1	0	.....	.....	7¢	.....	M	69	M	.....	80	100
100	54	280	20	280	20	100	100	.....	.....	M	51	M	.....	40	125
100	111	.....	.....	.....	.....	.....	.....	.....	.....	.....	13	P	.....	100	130
Unknown	.....	65	0	0	0	0	0	.....	.....	.....	2	P	None	100	165
500	239	340	.....	300	1	88	.....	66.7¢	35¢	M	16	M	.....	83	.....
250	106	600	15	600	15	100	100	50¢	12¢	M	51	M	None	90	150
350	174	375	.....	325	.....	87	100	20¢	5¢	M	61	M	$40	58	58
500	193	525	50	.....	.....	.....	.....	.....	.....	M	48	M	.....	60	75
450	150	500	.....	40	.....	8	.....	10¢	7¢	M	31	M	.....	85	85
125	50	300	10	300	10	100	100	25¢	12.5¢	M	54	M	None	140	140
.....	.....	300	6	250	6	83	100	30¢	8¢	M	26	M	None	60	125
225	79	340	.....	345	.....	100	.....	25¢	.....	M	66	M	.....	60	65
6	5	290	.....	290	.....	100	.....	60¢	.....	M	52	M	.....	62	62
250	60	800	20	750	20	94	100	25¢	9¢	M	85	P	None	60	95
500	200	285	20	0	0	0	0	.....	.....	.....	29	P	None	20	50
450	225	375	2	50	1	13	50	10¢	10¢	H	25	M	None	90	.....
110	86	250	.....	20	.....	8	.....	50¢	25¢	P	42	P	$14.30	58	80
80	49	310	3	125	2	40	67	30¢	25¢	M	31	M	$19.35	172	172
200	89	474	5	474	5	100	100	34¢	7¢	P	22	.....	.....	42	42
109	85	50	.....	.....	.....	.....	.....	.....	.....	M	35	M	.....	47	47
50	50	110	.....	.....	0	.....	0	.....	.....	.....	2	.....	None	55	100
400	143	600	45	.....	7	.....	2	35¢	8¢	M	24	M	.....	83	110
250	208	340	60	340	60	100	100	25¢	9¢	M	29	M	$4	60	60
150	150	200	.....	.....	5	.....	.....	.....	.....	P	25	M	$1	48	175

Municipality Ownership of Water works	Population	Source Type	Source Aver. Miles from City	Storage	Filters	Sterilized	Distribution System Total Miles of Main	Distribution System Kind of Pipe Mains	Distribution System Kind of Pipe Services	Pipe Sizes Inches Mains	Pipe Sizes Inches Services	Pump Capacity m. g. d.	Main Supply Metered
WASHINGTON (Con.)													
Charleston.....M	3,338	S	4.0	R	.....	.....	....	.....	.....	4-16	.....	6.2	...
Chelan & Lakeside.....P	1,300	S	0.0	R	No	Ch	....	.....	G	2-20	¾	1.3	Yes
Colfax.....M	3,027	U	6.0	R	.....	.....	6.0	IG	G	2-10	.....	0.7	No
Colville.....M	2,033	U	2.5	R	.....	.....	20.0	K	.....	2-10	.....	.....	No
Concrete.....P	945	S	1.0	None	No	.....	3.0	.....	G	4-6	.....	.....	No
Dayton.....M	2,695	SU	4.8	R	.....	Ch	12.3	I	G	4-16	.....	.....	No
Deer Park.....M	1,103	U	0.8	T	No	No	3.0	I	G	2-6	.....	0.01	No
Eatonville.....M	1,917	S	1.0	R	.....	.....	2.0	.....	.....	4-14	.....	2.9	...
Edmonds.....P	1,114	SU	1.0	R	No	Ch	4.0	IW	G	2-12	1½-4	.....	No
Ellensburg.....M	3,967	U	7.0	R	No	No	27.0	IW	.....	4-16	.....	7.4	Yes
Ferndale.....M	1,179	S	1.0	Pp	.....	.....	1.52	W	G	3-10	.....	0.7	...
Friday Harbor.....M	500	S	5.5	R	.....	.....	3.0	GW	WG	¾-8	.....	None	No
Goldendale.....M	1,203	U	12.0	R	No	.....	20.0	W St	.....	4-8	.....	0.75	No
Grandview.....M	1,250	U	0.3	T	No	No	7.5	IW	Cl	4-10	¾-2	1.4	No
Granite Falls.....M	1,000	S	1.5	R	No	No	3.5	W	G	4-12	¾-1	0.01	No
Kent.....M	2,282	U	10.0	R	.....	.....	30.0	IW	G	2-16	¾	.....	No
Kirkland.....M	2,200	U	2.0	Pp	.....	.....	15.0	IW	.....	4-6	.....	.....	...
Lynden.....M	1,244	S	0.5	RT	O	.....	3.8	W	G	4-8	¾	1.2	No
Mabton.....M	1,238	U	0.0	RT	No	No	....	W	G	4-8	.....	0.2	No
Monroe.....M	2,000	U	9.0	R	No	Ch	16.0	W	W	2-12	¾	None	No
Montesano.....P	3,000	S	6.0	R	No	.....	13.0	Wr	G	4-10	1½-2	.....	No
Newport.....P	1,500	U	3.0	RT	.....	.....	7.0	W	G	4-10	.....	.....	No
Oroville.....M	1,000	U	0.3	R	.....	.....	2.0	I	G	2-6	¾	.....	Yes
Palouse.....M	1,549	U	0.0	Pp	No	No	6.0	IW	G	4-10	1½-2	3.9	No
Port Townsend.....M	2,847	S	....	R	.....	Ch	25.0	W	.....	4-12	.....	None	No
Prosser.....P	1,697	U	0.5	RT	No	Ch	7.0	IW	G	4-8	¾	0.3	Yes
Pullman.....M	2,700	U	0.2	RPp	No	No	15.0	IW St	G	2-10	1½-2	0.4	No
Redmond.....M	500	U	2.0	R	.....	.....	....	.....	.....	4-6	.....	.....	...
Republic.....P	999	SU	0.8	RT	No	Ch	1.3	.....	G Wr	6-8	¾-1	0.9	No
Ritzville.....M	1,900	U	0.8	RT	No	No	10.0	I	G	¾-8	¾	1.3	Yes
Roslyn.....M	3,500	SU	6.0	R	.....	.....	10.0	St	G	12-15	½	None	...
Sprague.....M	800	U	0.0	R	No	No	5.0	I	G	4-8	¾	1.3	No
Sumas.....P	902	U	0.8	R	No	No	3.2	GW	G	2-12	½	0.15	No
Sumner.....P	2,520	U	1.5	R	No	No	6.0	IW	WG	¾-4	½-¾	None	No
Sunnyside.....M	2,180	U	....	R	.....	.....	5.3	IW St	G	4-8	.....	0.3	No
Waitsburg.....M	1,174	U	10.0	R	.....	.....	16.0	WC St	.....	4-8	.....	0.4	No
Waterville.....M	1,798	U	6.0	Pp	.....	.....	12.0	St	.....	4-8	.....	0.2	No
Winlock.....P	1,400	U	0.3	R	No	No	0.4	I	G	4-8	½-1	0.3	No
Woodland.....M	1,281	S	0.8	R	No	No	4.0	W	G	4-8	¾	0.3	No
WEST VIRGINIA													
Berkeley Springs.....P	1,800	U	....	T	No	No	5.0	G	G	4-6	½-¾	1.3	No
Bramwell.....P	1,458	U	1.0	R	No	No	2.0	I	G	4-6	¾	None	No
Bridgeport.....M	1,500	U	0.5	T	No	No	8.0	.....	G	1-8	¾	.....	No
Davis.....M	2,491	S	0.5	R	No	Ch	2.0	I	G	4-8	1-2	2.7	No
Fairview.....M	1,000	U	0.5	R	No	No	4.0	IG	G	2-6	½-1	0.09	No
Follansbee.....P	3,135	U	0.0	R	No	No	9.0	I	L	4-8	.....	0.72	No
Gassaway.....P	1,700	S	1.0	R	No	Ch	4.0	I St	G St	2-8	½-1	0.4	No
Kimball.....P	1,630	U	0.5	T	No	No	2.4	I St	G	½-6	½-1¼	0.4	No
Logan.....P	2,998	S	0.8	R	O	Ch	1.3	I	G	4-8	.....	0.5	No
Montgomery.....P	3,000	U	0.0	RT	No	No	3.5	St	G	2-6	¾-1	0.5	No
Mullens.....P	3,000	U	0.0	T	No	No	3.7	I	G	4-8	¾	1.2	No
New Cumberland.....P	1,816	S	0.3	T	No	No	2.0	I	G	2-6	¾-2	0.09	No
Philippi.....P	1,500	S	0.2	R	No	Ch	5.5	IG	G	¾-8	½-2	1.2	No
Piedmont.....M	2,835	S	5.0	R	No	No	5.0	I	LG	10	.....	1.35	No
Point Pleasant.....P	3,059	S	0.0	R	No	No	7.0	I	G	4-8	½-2	0.6	No
Romney.....M	1,200	U	3.0	R	.....	.....	4.0	I Wr	.....	3-4	.....	0.1	No
Ronceverte.....M	2,319	S	0.5	R	No	Ch	....	.....	I	4-6	.....	0.4	No
Shepherdstown.....P	1,070	S	0.3	T	A	Ch	5.0	I	.....	4-6	.....	0.1	No
Spencer.....P	3,000	S	1.0	R	No	Ch	12.0	I	GL	4-6	¾	0.8	No
Sutton.....P	1,500	S	1.0	R	No	No	3.5	I	G	4-6	½-1½	2.4	No
Union.....M	1,951	U	2.0	R	.....	.....	2.0	I	.....	4-5	.....	None	No
Wellsburg.....M	4,918	S	0.0	R	No	No	11.0	I	L	2-10	.....	3.0	Yes
Williamstown.....P	2,400	S	1.0	.....	.....	.....	6.0	I	G	1½-6	½-1	None	Yes
WISCONSIN													
Algoma.....M	1,911	U	....	RT	.....	.....	3.5	I	.....	4-10	¾	1.0	Yes
Arcadia.....M	1,418	U	0.0	R	.....	.....	3.8	I	G	¾-8	.....	0.3	No
Baldwin.....M	750	U	0.1	T	.....	.....	2.0	I	G	4-6	¾-1¼	0.04	Yes
Barron.....M	1,625	U	0.5	T	No	No	4.0	I Wr	G	¾-6	¾	1.4	No
Bayfield.....M	1,441	U	0.3	R	No	.....	6.5	I	.....	4-8	.....	1.6	Yes
Berlin.....M	4,400	U	0.0	RT	No	No	10.3	I	GL	4-12	¾-2	2.0	No
Black River Falls.....M	2,500	S	1.0	T	.....	Ch	5.0	I	G	4-10	½-1	1.0	No
Boscobel.....M	1,620	U	0.2	R	No	No	4.0	I	GI	4-8	¾	0.5	No
Brillion.....M	1,377	U	0.0	RT	No	No	4.0	I	L	4-10	¾-1½	1.0	No
Brodhead.....M	1,600	U	0.0	T	No	No	5.0	I	G	2-8	¾	0.7	No
Cassville.....M	890	U	0.0	R	.....	.....	2.0	I	.....	4-6	.....	0.8	No

Consumption		Number of Services		Number of Meters		Per Cent Metered		Meter Rates per 1,000 Gallons		Meters Owned by	Hydrants			Average Pressure lbs. per sq. in.	
Average Daily in 1,000 gals.	Per Capita	Domestic	Industrial	Domestic	Industrial	Domestic	Industrial	Max. Dom.	Min. Ind.		Number	Owned by	Aver. Rental each per year	Domestic	Fire
3,000	900	1,500	.....	1,500	.....	100	.....	20¢	20¢	M	31	M	None	95	95
1,000	770	.....	.....	348	.....	85	100	20¢	8¢	P	29	M	$39.00	60	60
500	165	750	.....	650	.....	87	.....	$1.34	13.4¢	M	53	M	$9.44	95	95
136	67	450	.....	425	.....	95	.....	30¢	5¢	M	38	M	.....	130	130
Unknown	.....	237	.....	0	.....	0	.....	.....	.....	.....	15	P	$30	80	90
271	101	680	.....	700	.....	100	.....	22¢	.....	M	90	M	$18	65	65
.....	.....	250	.....	250	.....	100	.....	31¢	.....	H	30	M	$90	90	140
.....	.....	230	.....	0	.....	0	.....	.....	.....	.....	17	M	.....	50	100
200	180	400	10	17	10	4	100	34¢	7¢	P	26	M	.....	45	68
1,330	336	887	.....	260	.....	29	.....	13¢	8¢	M	118	M	.....	95	130
38	32	244	.....	.....	5	.....	.....	.....	.....	H	17	M	.....	57	57
.....	.....	.....	.....	0	0	.....	.....	.....	.....	.....	17	M	.....	.....	73
.....	.....	400	.....	0	.....	0	.....	.....	.....	.....	29	M	$18	80	150
150	120	391	9	391	9	100	100	50¢	8¢	M	27	M	$75	35	143
.....	.....	100	.....	.....	1	.....	.....	40¢	11¢	B	21	M	$4	70	120
240	105	800	25	200	25	25	100	$1.70	$1.25	M	41	M	$5	85	85
500	228	.....	.....	388	.....	.....	.....	34¢	5.4¢	M	61	M	.....	.....	.....
30	24	423	.....	.....	24	30	30	$2.20	$2.20	M	31	M	.....	52	52
50	40	211	.....	148	.....	70	.....	75¢	10¢	M	23	M	None	42	42
750	375	662	10	100	5	20	50	34¢	5.4¢	M	40	M	None	90	90
250	83	300	.....	250	.....	83	100	34¢	10.4¢	P	43	P	$3.50	80	80
300	200	.....	5	458	5	95	100	25¢	10¢	P	22	M	.....	50	40
110	110	280	.....	220	.....	79	.....	20¢	.....	H	14	M	.....	85	85
.....	.....	295	5	295	5	100	100	$1.25	10¢	M	26	M	.....	100	150
160	56	810	14	106	14	13	100	50¢	14¢	M	68	M	.....	70	125
20	12	452	100	450	75	100	75	88¢	15¢	P	23	P	$63.60	42	80
265	98	850	.....	845	.....	99	.....	25¢	15¢	H	69	M	.....	73	83
.....	.....	155	.....	4	.....	3	.....	.....	.....	M	19	M	.....	76	80
30	30	140	24	0	0	0	0	.....	.....	.....	13	P	$72	100	100
250	132	500	40	500	40	100	100	$1.00	15¢	M	60	M	.....	45	45
800	228	950	.....	48	35	5	.....	.....	11.1¢	MH	52	M	.....	85	120
336	420	250	.....	140	.....	56	.....	58¢	.....	H	36	M	$15	60	120
75	83	168	2	25	.....	15	.....	$3.60	$3.60	P	17	P	$3	68	54
1,250	496	600	4	0	0	0	0	.....	.....	.....	20	M	None	65	65
250	115	521	6	521	6	100	100	36¢	12¢	M	38	M	$6	40	80
130	110	312	.....	285	.....	91	.....	26.7¢	10.7¢	.....	37	.....	.....	65	65
177	98	350	.....	300	.....	86	.....	$1.50	.....	.....	20	M	None	50	50
180	129	250	20	78	20	31	100	58.3¢	25¢	P	28	M	$48	56	56
70	55	212	6	187	6	88	100	27¢	13.4¢	M	25	M	.....	52	52
65	36	257	15	167	15	65	100	75¢	18¢	P	27	P	$50	123	123
25	17	120	.....	0	.....	0	.....	.....	.....	.....	16	.....	$25	100	100
40	27	312	1	312	1	100	100	55¢	33¢	.....	39	M	None	115	115
100	40	450	3	0	0	0	0	.....	.....	.....	25	M	.....	90	140
17	17	220	0	49	0	22	.....	40¢	.....	M	24	M	None	150	150
80	26	700	.....	788	.....	100	.....	60¢	20¢	P	36	P	$65	150	150
80	47	365	.....	350	.....	96	.....	70¢	50¢	P	18	P	$36	140	140
82	50	235	8	5	6	2	75	.....	.....	P	19	.....	$25	66	80
300	100	658	4	481	4	73	100	60¢	18¢	P	29	M	.....	90	100
250	83	800	3	750	3	94	100	$1.10	20¢	P	20	P	$120	80	80
75	25	274	53	274	53	100	100	75¢	40¢	P	47	P	$55	134	134
50	28	255	3	239	3	94	100	50¢	50¢	P	.....	.....	.....	95	.....
250	166	480	6	16	6	33	100	60¢	15¢	P	35	M	$45	128	128
300	106	700	14	8	7	1	50	40¢	10¢	M	120	M	.....	60	110
100	33	575	5	550	5	96	100	75¢	30¢	P	60	P	$75	100	100
60	50	225	2	50	2	22	100	25¢	12¢	M	16	M	.....	.....	80
200	86	.....	.....	300	.....	.....	.....	.....	.....	M	50	M	.....	.....	125
16	15	140	.....	.....	.....	.....	.....	50¢	50¢	P	15	P	.....	70	70
150	50	450	1	510	1	100	100	80¢	12¢	P	32	P	$75	100	100
300	200	235	56	80	18	34	32	60¢	27¢	P	23	P	.....	150	150
.....	.....	25	.....	.....	.....	.....	.....	.....	.....	.....	6	.....	.....	40	40
700	142	1,150	.....	550	13	48	.....	50¢	12¢	M	68	M	None	140	140
3	1	276	9	234	8	85	89	54¢	54¢	P	20	M	$54	78	78
65	29	260	.....	260	.....	100	100	30¢	30¢	H	45	M	.....	70	70
53	38	296	.....	86	.....	29	.....	45¢	25¢	M	31	M	$50	96	96
35	47	200	10	200	10	100	100	40¢	40¢	M	23	M	.....	45	45
100	62	300	10	75	10	25	100	20¢	20¢	M	28	M	$10	43	.....
156	108	345	.....	137	.....	40	.....	40¢	10¢	M	43	M	$29	120	120
170	39	637	7	482	7	76	100	27¢	20¢	H	99	.....	.....	53	100
125	50	420	.....	90	.....	21	.....	30¢	15¢	H	24	M	$17.50	100	100
50	31	180	0	180	0	100	0	30¢	.....	H	80	M	.....	80	80
65	47	150	20	75	20	50	100	63¢	15¢	M	30	M	$60	55	57
80	50	271	.....	271	.....	100	.....	30¢	.....	M	35	M	.....	65	83
.....	.....	26	.....	.....	.....	.....	.....	40¢	40¢	MH	.....	M	.....	78	67

Municipality Ownership of Water works	Population	Source Type	Source Aver. Miles from City	Storage	Filters	Sterilised	Distribution System Total Miles of Main	Distribution System Kind of Pipe Mains	Distribution System Kind of Pipe Services	Pipe Sizes Inches Mains	Pipe Sizes Inches Services	Pump Capacity m. g. d.	Main Supply Metered
WISCONSIN (Con.);													
Cedarburg.....M	1,738	U	0.0	RT	No	No	7.0	I	L	4-8	¾-4	0.9	No
Clintonville.....M	3,275	U	0.3	Pp	.....	.....	8.5	I	.....	3-10	.....	2.5	...
Coon Valley.....M	1,000	U	0.0	R	No	No	0.7	I	G	4-8	4-6	0.4	No
Cumberland.....M	1,528	U	0.5	R	.....	.....	2.5	I	G	4-8	.....	0.5	Yes
Dodgeville.....M	2,100	U	0.5	RPp	.....	None	3.0	I	IL	4-8	¾	.....	No
Eagle River.....M	1,200	S	0.1	.....	.....	.....	2.5	I	G	6-8	.....	12.0	...
East Troy.....M	804	U	....	RT	No	No	2.5	I	LG	4-8	¾	4.0	No
Edgerton.....M	2,688	U	0.3	RPp	No	.....	8.0	I	.....	4-10	.....	3.7	No
Elkhorn.....M	2,000	U	0.5	RPp	No	No	12.0	I	L	4-8	⅝-4	1.0	Yes
Ellsworth.....M	1,135	U	0.0	R	No	No	4.0	I	G	4-8	.....	0.02	No
Elmwood.....M	700	U	0.0	RT	No	No	1.0	I	G	4-6	¾	0.03	No
Evansville.....M	2,209	U	0.3	Pp	No	No	6.5	I	L	4-8	¾	1.6	No
Florence.....M	1,708	S	0.2	None	No	No	2.0	IW Wr	G	4-8	¾	1.2	No
Gratiot.....M	338	U	0.0	T	No	No	2.5	I	G	6-8	¾	0.07	No
Hartford.....M	4,515	U	....	RPp	.....	.....	6.0	I	L	4-10	.....	0.3	...
Hayward.....M	1,302	S	....	RPp	.....	.....	5.0	I	.....	4-10	.....	2.7	...
Jefferson.....M	2,572	U	0.1	RPp	No	No	9.5	I	L	4-10	⅝-1	3.0	Yes
Kiel.....M	1,599	U	0.1	T	.....	.....	14.0	.....	L	4-8	.....	0.4	...
Ladysmith.....M	3,581	U	0.4	T	No	No	10.0	I	GL	4-10	¾	1.3	Yes
Lake Mills.....M	1,754	U	0.0	Pp	.....	.....	6.0	.....	.....	4-6	.....	0.9	Yes
Lancaster.....M	2,485	U	2.5	Pp	.....	.....	11.0	I	G	4-8	1	0.7	No
Linden.....M	490	U	0.0	RPp	.....	.....	0.6	I	I	4-6	¾	0.008	...
Little Chute.....M	2,017	U	0.0	RT	.....	.....	2.0	I	L	6-12	¾	0.1	No
Lodi.....M	1,200	U	0.5	R	No	No	3.0	I	G	1½-8	½-4	1.2	No
Markesan.....M	986	U	0.0	RT	No	No	3.0	I	L	4-8	⅝-1	0.7	No
Mauston.....M	1,966	U	0.5	R	No	No	4.0	I	G	1½-8	¾	0.8	No
Mayville.....M	3,011	U	0.0	RPp	No	No	5.5	I	LI	4-10	¾-3	0.4	No
Mazomanie.....M	917	U	0.0	R	No	No	2.0	I	G	4-6	.....	0.2	No
Medford.....M	1,846	SU	0.0	RPp	No	No	4.0	I	G	6-10	¾-4	0.9	No
Mondovi.....M	1,554	U	0.0	R	.....	.....	3.0	I	I	6-8	.....	0.5	No
Neillsville.....M	2,160	SU	0.8	RPp	A	Ch	6.5	I	G	4-10	¾	1.3	Yes
Neopit.....M	700	S	0.0	None	No	No	5.0	St	St	2½-12	.....	2.0	No
New London.....M	4,667	U	1.0	RPp	No	No	30.0	I	L	4-8	¾-2	0.9	No
Niagara.....M	2,400	U	0.0	R	No	No	2.0	I	GL	4-8	¾-2	0.1	No
N. Fond du Lac.....P	2,150	U	0.1	RPp	No	No	7.0	I	L	4-10	.....	0.7	No
Oconto Falls.....M	2,200	U	0.0	R	No	No	5.8	I	GL	4-8	¾-2	.....	No
Onalaska.....M	1,066	U	0.2	Pp	No	No	3.5	I	G	2-8	.....	0.7	Yes
Oregon.....M	1,000	U	0.0	T	No	No	2.0	I	L	4-6	¾	0.3	No
Owen.....M	1,083	U	0.3	T	No	No	2.5	I	GL	6-8	¾-3	.....	No
Park Falls.....M	2,676	S	0.1	None	No	No	4.5	I	GL	4-8	¾	1.4	Yes
Phillips.....M	2,200	U	2.5	RPp	No	No	....	I	I	4-10	.....	.....	Yes
Prescott.....M	892	U	1.0	R	No	No	4.0	I	GI	4-10	¾-2	.....	No
Randolph.....M	1,200	U	....	T	No	No	3.5	I	L	6-10	¾	1.0	Yes
Reedsburg.....M	2,997	U	0.0	RPp	No	No	7.0	I	G	2-10	¾-2	1.5	Yes
Ripon.....P	3,929	U	2.0	RPp	No	No	12.0	I	I	1-12	½-6	1.8	Yes
River Falls.....M	2,650	SU	0.5	R	.....	.....	6.0	I	G	4-10	.....	0.6	No
Sauk City.....M	1,162	U	0.0	T	No	No	5.0	I	L	4-8	¾	1.0	Yes
Shawano.....M	3,544	U	0.1	R	.....	.....	7.0	I	L	4-8	.....	2.2	...
Sheboygan Falls.....M	2,002	U	0.1	RT	.....	.....	6.0	.....	.....	4-10	.....	0.6	...
Shell Lake.....M	902	S	....	Pp	No	No	3.0	I	.....	3-8	.....	0.9	No
Shullsburg.....M	1,158	U	0.5	T	No	No	7.0	1 St	LG	4-8	½	0.8	...
Sparta.....M	4,600	U	0.5	T	No	No	16.0	I	IG	2-12	.....	.....	Yes
Spring Green.....M	694	U	0.3	T	No	No	3.0	I	G	4-8	¾	0.4	No
Spring Valley.....M	972	U	0.0	R	No	No	1.0	I	GI	6	¾	0.05	No
Stanley.....M	2,600	U	0.1	T	No	No	6.7	I	G	¾-8	¾-1½	1.2	No
Stratford.....M	1,014	U	0.0	T	No	No	....	.....	L	1½-8	¾	0.3	No
Sturgeon Bay.....M	4,553	U	0.1	RPp	.....	.....	8.0	I	L	6-12	.....	3.0	No
Tomahawk.....M	2,898	U	0.5	RPp	No	No	12.3	I	GL	2-10	.....	1.5	No
Turtle Lake.....M	679	U	0.0	RPpT	No	No	1.23	ISt	G	2-6	2-6	0.04	No
Washburn.....P	3,707	S	0.5	R	.....	.....	6.5	I	G	6-12	.....	0.3	...
Waterford.....M	700	U	0.0	T	No	No	2.5	I	G	4-6	½-¾	0.09	No
Waupun.....M	4,440	U	0.3	RPp	No	No	9.5	I	LG	4-10	¾	0.8	No
West Bend.....M	3,800	U	0.2	T	No	No	10.0	I	L	4-10	¾-1	.....	Yes
West Salem.....M	1,027	U	0.0	R	.....	.....	3.5	I	G	4-8	.....	0.1	Yes
Whitewater.....M	3,215	U	0.5	RPpT	No	Ch	11.0	I	LG	4-14	.....	3.0	Yes
Withee.....M	443	U	0.3	Pp	No	No	1.0	I	G	4-8	¾	.....	No
Wonewoc.....M	798	U	0.1	R	No	No	2.2	I	G	4-8	.....	0.4	Yes
WYOMING													
Buffalo.....M	1,772	S	5.8	None	No	No	10.0	IW St	G	4-18	¾-1	None	No
Douglas.....M	3,000	U	18.0	R	No	No	7.0	I	I	4-12	⅝-¾	1.8	Yes
Evanston.....M	3,500	S	10.0	R	A	.....	10.0	IW St	G	4-12	¾	1.0	Yes
Fort Russell.....M	1,500	U	2.5	R	A	.....	20.0	I	I	4-10	¾-2	.....	Yes
Gillette.....M	1,157	U	1.0	R	No	Ch	5.0	I	G	4-6	.....	0.2	No

Consumption		Number of Services		Number of Meters		Per Cent Metered		Meter Rates per 1,000 Gallons		Meters Owned by	Hydrants			Average Pressure lbs. per sq i.n.	
Average Daily in 1,000 gals.	Per Capita	Domestic	Industrial	Domestic	Industrial	Domestic	Industrial	Max. Dom.	Min. Ind.		Number	Owned by	Aver. Rental each per year	Domestic	Fire
54	31	300	.....	300	.....	100	.....	35¢	15¢	M	60	M	$25	65	65
150	46	750	.....	625	.....	83	.....	12¢	6¢	M	72	M	.....	60	100
.....	.....	58	16	54	12	93	75	45¢	.....	M	10	M	.....	85	.....
85	86	280	.....	.....	.....	.....	.....	.....	.....	.....	26	.....	.....	41	100
33	16	305	.....	75	.....	25	.....	40¢	40¢	M	41	M	.....	60	200
.....	.....	100	.....	.....	.....	.....	.....	.....	.....	.....	25	.....	.....	50	80
30	37	85	60	85	60	100	100	50¢	20¢	H	49	M	$45	50	58
290	108	710	.....	.....	.....	90	.....	17¢	12¢	M	69	M	.....	65	100
250	125	515	8	515	8	100	100	40¢	14.7¢	MH	70	M	$30	55	80
25	22	255	.....	254	.....	100	.....	60¢	50¢	H	42	M	.....	78	78
.....	.....	.....	.....	.....	.....	.....	.....	30¢	10¢	M	14	M	.....	120	120
47	21	425	.....	425	.....	100	100	48¢	22¢	M	62	M	$40.40	70	125
Unknown	.....	146	.....	0	0	0	0	.....	.....	.....	33	M	None	60	130
Unknown	.....	75	1	44	1	50	100	25¢	10¢	M	14	M	.....	80	80
275	61	1,000	100	1,000	100	100	100	21.5¢	12¢	H	71	.....	$30	65	80
24	18	.....	.....	.....	.....	.....	.....	.....	.....	.....	78	.....	.....	55	110
285	111	646	21	646	21	100	100	16¢	5¢	M	62	M	$45	65	120
60	38	332	6	331	4	100	67	24¢	13.4¢	M	40	M	$47.80	54	.....
180	50	750	.....	400	.....	53	.....	35¢	8¢	M	70	M	.....	65	125
150	86	400	.....	400	.....	100	.....	25¢	4¢	.....	80	.....	$33	53	85
150	60	815	.....	640	.....	79	.....	40¢	.....	M	91	M	.....	31	70
7	14	39	16	0	0	0	0	.....	.....	.....	12	M	.....	.....	40
15	8	75	.....	75	.....	100	.....	.....	.....	M	20	M	.....	70	70
90	75	298	6	212	6	71	100	15¢	8¢	M	33	M	$42	75	75
40	41	135	15	135	11	100	.....	50¢	50¢	M	34	M	$2.75	64	100
105	54	386	.....	277	.....	72	.....	20¢	.....	M	48	M	$51.20	80	80
133	44	632	6	632	6	100	100	30¢	15¢	H	84	M	.....	78	83
36	39	67	23	64	23	96	100	30¢	30¢	M	21	M	.....	85	85
100	54	286	16	280	16	98	100	30¢	10¢	M	35	M	$72	40	105
12	8	163	.....	121	.....	74	.....	30¢	.....	H	28	M	.....	65	65
285	132	477	11	471	11	99	100	40¢	7¢	MH	74	M	.....	85	100
250	360	7	1	0	0	0	0	.....	.....	.....	92	M	None	50	100
122	26	725	10	700	10	100	100	20¢	12¢	M	67	M	.....	60	90
117	49	150	0	0	0	0	0	.....	.....	.....	24	M	$15	80	125
.....	.....	350	.....	125	.....	36	.....	40¢	.....	P	31	.....	.....	38	80
80	36	223	2	132	2	59	100	40¢	11¢	M	32	M	$97	43	88
79	74	149	.....	107	.....	72	.....	20¢	4¢	M	23	.....	$50	60	65
16	10	133	34	29	5	22	15	5¢	3¢	H	35	M	None	47	65
20	19	128	26	123	22	96	85	30¢	10¢	M	30	M	None	45	45
71	27	233	.....	208	.....	89	.....	35¢	10¢	MH	35	M	$72	65	113
130	59	150	2	150	2	100	100	70¢	.....	M	19	M	.....	75	110
27	30	146	0	72	0	40	0	30¢	.....	M	30	M	$3	09	60
50	42	197	7	197	7	100	100	25¢	20¢	M	38	M	$25	65	65
500	167	875	.....	875	.....	100	100	8¢	6.9¢	M	60	M	$52	65	65
400	102	801	35	209	13	26	37	25¢	6¢	P	116	P	$59	50	100
300	113	622	.....	220	.....	35	100	20¢	6¢	H	60	M	.....	65	68
75	65	95	30	95	30	100	100	.....	.....	M	53	M	$37	50	113
175	50	337	.....	328	.....	97	.....	24¢	9¢	M	63	M	.....	40	100
80	40	381	.....	381	.....	100	.....	30¢	15¢	M	56	M	$50	60	80
.....	.....	200	.....	0	0	0	0	.....	.....	.....	33	M	.....	.....	110
25	22	130	.....	0	.....	0	.....	.....	.....	.....	31	M	None	84	160
350	76	757	5	757	5	100	100	13.3¢	9.3¢	M	99	M	$60	60	105
Unknown	.....	60	15	60	15	100	100	30¢	20¢	M	31	M	.....	65	80
.....	.....	62	40	0	0	0	0	.....	.....	.....	12	M	$5	.....	66
145	56	343	62	173	53	50	86	30¢	6¢	M	42	M	.....	73	73
10	10	100	2	100	2	100	100	50¢	20¢	M	19	M	None	60	80
300	67	500	.....	480	.....	96	.....	30¢	.....	H	40	M	$70	60	120
600	208	450	.....	32	.....	7	.....	.....	.....	M	56	.....	.....	45	135
26	38	135	2	60	2	45	100	50¢	20¢	M	17	M	$50	45	45
.....	.....	420	.....	1	.....	.....	.....	.....	.....	.....	64	.....	.....	80	115
87	124	140	13	140	13	100	100	20¢	5¢	M	47	M	.....	60	70
250	56	965	.....	900	.....	93	.....	35¢	40¢	M	65	M	$40	50	59
154	41	650	28	645	28	99	100	20¢	13.4¢	H	95	M	.....	55	75
10	10	254	48	254	48	100	100	.....	.....	H	35	M	$30	76	.....
350	109	525	3	610	3	90	100	40¢	10¢	M	112	.....	.....	70	125
5	11	46	.....	36	.....	78	.....	.....	.....	M	11	M	.....	45	.....
25	31	250	10	245	.....	98	.....	25¢	25¢	M	12	M	.....	60	125
200	113	400	0	0	0	0	0	.....	.....	.....	46	M	None	80	150
500	167	459	.....	428	.....	94	.....	19¢	15¢	H	56	.....	.....	75	75
1,800	510	700	5	0	5	0	100	.....	5¢	P	108	M	.....	100	100
300	200	258	1	0	0	0	0	.....	.....	.....	87	.....	.....	90	90
76	66	240	0	0	0	0	0	.....	.....	.....	50	M	None	80	80

Municipality Ownership of Water works	Population	Source		Storage	Filters	Sterilized	Distribution System			Pipe Sizes Inches		Pump Capacity m. g. d.	Main Supply Metered
		Type	Aver. Miles from City				Total Miles of Main	Kind of Pipe					
								Mains	Services	Mains	Services		
WYOMING (Con.)													
Kemmerer.....P	1,750	S	0.5	T	No	Ch	4.0	I	I	4-12	.....	.....	.....
Lander.....M	2,133	S	3.0	R	No	No	....	.....	.....	.....	.....	.....	.....
Newcastle.....M	1,005	S	25.0	R	No	No	26.0	IW Te St	G	½-10	½-4	None	Yes
Pine Bluffs.....M	1,013	U	0.0	Pp	No	No	2.0	I	G	4-6	.....	0.7	No
Powell.....M	2,463	S	7.0	RPpT	OA	No	11.9	IW	G	2-8	¾-1¼	0.4	Yes
Rawlins.....M	3,969	U	0.8	R	No	No	41.0	IW St	G	4-16	.....	1.5	...
Riverton.....M	2,023	U	0.5	T	No	No	5.0	I	G	8	4	0.6	Yes
Thermopolis.....M	2,095	SU	1.0	RPp	No	No	8.5	I	LG	4-12	.....	1.3	Yes

Additional Reports from Cities of Less Than 5,000

Alton, Iowa.....M	1,046	U	0.1	Pp	No	No	2.2	IG	IG	2-8	.....	.....	No
Brownstown, Ind.....P	3,127	U	....	RPp	.....	.....	3.0	I	.....	4-8	.....	0.2	...
Canton, Miss.....M	3,252	U	0.8	RPp	.....	.....	14.0	I	G	4-10	.....	2.5	No
Cohasset, Mass.....P	2,639	U	....	R	A	.....	18.4	I	G	4-12	.....	0.8	No
Conway, N. H.....M	1,200	U	3.0	R	No	No	6.0	I	G	2-10	.....	None	No
Cuthbert, Ga.....M	3,022	U	0.1	RPp	.....	.....	9.5	I	.....	4-10	.....	1.0	...
Dexter, Mo.....M	2,635	U	0.5	R	No	No	3.0	I	G	2-8	.....	0.9	No
Elk River, Minn.....M	983	U	0.0	T	No	No	3.5	I	G	4-6	¾	0.9	Yes
Farmington, Mo.....M	2,685	U	0.8	RPp	No	.....	4.0	I	G	4-6	.....	0.2	No
Gatesville, Tex.....M	2,499	U	0.4	RT	No	No	21.0	I	G	4-6	¾	.....	No
Highland, Calif.....P	2,000	U	....	R	.....	.....	.....	.....	G	½-8	½-¾	.....	No
Hood River, Ore.....M	3,195	U	3.3	R	No	Ch	15.0	I St	G	4-12	¾	0.8	No
Keyport, N. J.....M	4,415	U	0.0	Pp	.....	No	8.8	I	G	4-12	½-1	.....	No
Plymouth, Mich.....M	4,000	....	5.5	RT	No	No	16.0	I	GL	4-10	¾-4	3.4	Yes
Rushville, Ill.....M	2,275	U	6.5	RPp	A	.....	6.0	I	L	4-10	½-1	1.1	No
Silverton, Col.....M	500	S	2.0	R	.....	.....	8.0	K	.....	8-10	.....	.....	...
Suisun, Calif.....M	960	U	....	R	No	No	12.0	.....	.....	.....	.....	.....	...
Sunnyvale, Calif.....M	3,390	U	0.3	Pp	.....	.....	4.5	IWr	G	2-8	¾-3	0.7	No
Susquehanna, Pa.....P	3,764	U	3.0	R	No	Ch	21.0	I	G Ll	2-12	¾-2	.....	Yes
University Place, Nebr..M	4,112	U	0.1	PpR	.....	Ch	8.0	I	.....	4-10	.....	0.7	...
Versailles, Ohio.....M	1,600	U	0.3	.....	No	.....	6.0	I St	L	4	¾	1.4	Yes
Walton, N. Y.....P	3,598	SU	2.8	R	A	Ch	22.5	I	.....	4-10	.....	0.4	No
Whitehall, Mich.....M	1,307	SU	0.3	.....	No	.....	7.0	I	G	4-8	.....	2.0	...
Winamac, Ind.....M	1,607	S	0.5	Pp	.....	.....	4.5	I	.....	3-10	.....	1.0	...
Winthrop, Me.....M	1,902	S	0.6	Pp	.....	.....	4.5	I	G	6-10	¾-2	1.5	No

Cities Above 5,000 Population Not Reported in

Bakersfield, Calif.....P	25,000	U	....	R	No	No	85.0	.....	.....	.....	.....	.....	...
Bellefontaine, Ohio.....M	9,336	U	1.0	R	No	No	27.0	I	GL	4-16	¾-1	6.5	No
Blairsville, Pa.....M	5,000	U	0.8	R	No	.....	11.5	I	L	3-12	¾-1	0.4	No
Catlettsburg, Ky. and Kenova & Ceredo, W. Va...P	10,000	S	1.0	R	O	Ch	11.0	I	GB	4-12	.....	8.5	No
Dadeville, Ala.....M	15,000	S	0.8	RPpT	O	Ch	3.5	Gl	G	2-6	½-2	0.2	No
Eureka, Calif.....M	18,000	S	....	R	.....	.....	77.3	.....	.....	.....	.....	.....	...
Fulton, Mo.....M	5,595	U	0.5	RPp	No	No	12.0	I	Wr L	4-8	¾-4	0.7	No
Long Beach, Calif.....M	130,000	U	....	R	No	No	215.4	.....	.....	.....	.....	.....	...
Marlboro, Mass.....M	15,028	S	1.8	RPp	No	No	40.0	I	L	4-16	¾	6.5	No
Marysville, Calif.....P	7,000	U	....	.....	No	No	....	.....	.....	.....	.....	.....	...
Mishawaka, Ind.....M	15,195	U	1.5	R	No	No	40.2	I	L	4-20	¾-6	9.5	Yes
Oakland, Calif., etc.....P	460,550	SU	11.0	RT	A	Ch	1182.0	I Wr St	Gl	2-37½	¾-8	86.0	Yes
Okemah, Okla.....M	8,000	S	3.5	Pp	.....	.....	11.4	I	G	4-6	¾	2.2	...
Redding, Calif.....P	5,000	S	....	R	.....	Ch	....	.....	.....	.....	.....	.....	...
Sacramento, Calif.....M	100,000	S	....	.....	.....	.....	186.0	.....	.....	.....	.....	.....	...
Santa Monica, Calif.....M	40,000	U	....	R	No	No	210.0	.....	.....	.....	.....	.....	...
Stevens Point, Wis.....M	11,371	U	2.0	Pp	No	No	21.0	I	G	4-16	.....	.....	Yes
Stockton, Calif.....P	55,000	U	....	R	No	No	150.0	.....	.....	.....	.....	.....	...
Tallahassee, Fla.....M	5,637	U	1.0	RPp	No	.....	8.0	I	I	4-12	¾-4	1.4	No
Tuscaloosa, Ala.....M	15,000	S	....	Pp	O	Hy	20.0	I	GL	¾-3	.....	11.0	No
Tyrone, Pa.....P	9,084	S	2.5	R	No	Ch	21.0	I	G	3-14	¾-2	.....	No
Watertown, Mass.....M	21,457	S	....	.....	.....	.....	56.2	I Cl	Cl	2-16	¾-2	.....	Yes

Consumption		Number of Services		Number of Meters		Per Cent Metered		Meter Rates per 1,000 Gallons		Meters Owned by	Hydrants			Average Pressure lbs. per sq. in.	
Average Daily in 1,000 gals.	Per Capita	Domestic	Industrial	Domestic	Industrial	Domestic	Industrial	Max. Dom.	Min Ind.		Number	Owned by	Aver. Rental each per year	Domestic	Fire
500	286	400	0	0	0	0	0	.....	.....	.....	11	P	.....	65	85
Unknown	.....	350	.....	0	0	0	0	.....	.....	.....	46	M	.....	75	.....
500	500	250	1	0	0	0	0	.....	.....	.....	17	M	None	120	120
60	59	100	.....	150	.....	94	.....	30¢	10¢	M	25	M	.....	80	80
400	135	340	.....	.....	.....	.....	.....	.....	.....	.....	23	M	.....	60	60
1,000	252	1,100	.....	207	.....	19	100	.....	.....	.....	137	M	.....	60	88
150	74	350	25	300	25	86	100	60¢	10¢	H	30	M	.....	70	.....
250	119	500	.....	498	.....	100	.....	50¢	20¢	H	50	M	$50	90	90

Population with Cities Arranged Alphabetically

13	12	175	.....	170	.....	97	.....	40¢	15¢	H	20	M	.....	40	63
50	16	115	.....	.....	.....	.....	.....	.....	.....	.....	29	.....	.....	75	90
200	62	675	.....	675	.....	100	.....	26¢	10¢	.....	97	.....	.....	50	100
500	190	796	.....	48	.....	6	.....	47¢	.....	P	102	P	$75	63	63
.....	.....	130	.....	0	.....	0	.....	.....	.....	.....	28	M	.....	.....	30
200	66	400	.....	300	.....	75	.....	.....	.....	M	75	M	.....	60	150
118	45	350	.....	350	.....	100	.....	50¢	.....	H	35	M	None	60	80
Unknown	.....	125	8	125	8	100	100	25¢	25¢	M	23	M	None	66	66
60	22	330	.....	330	.....	100	.....	33¢	27¢	H	35	M	.....	50	150
200	80	500	.....	200	.....	40	.....	50¢	25¢	.....	31	M	.....	45	100
.....	.....	350	.....	320	.....	92	.....	40¢	20¢	P	20	M	.....	98	93
1,000	314	800	.....	22	.....	3	.....	33¢	11¢	M	54	M	None	75	93
175	40	1,000	100	1,000	100	100	100	44¢	44¢	H	102	M	$25	40	60
350	88	1,100	15	450	15	41	100	15¢	2¢	M	120	M	$10	37	90
75	33	300	.....	280	.....	93	.....	50¢	40¢	M	39	M	None	40	65
.....	.....	600	.....	.....	.....	.....	.....	.....	.....	.....	32	.....	.....	90	90
192	200	250	.....	170	.....	68	.....	40¢	15¢	.....	27	M	None	76	76
300	89	608	.....	.....	8	.....	.....	19¢	7¢	M	73	M	.....	36	105
650	172	916	.....	40	.....	44	.....	40¢	15¢	P	46	P	$20	135	135
180	44	800	.....	800	.....	100	.....	25¢	.....	H	53	M	None	57	78
.....	.....	400	.....	40	.....	10	.....	27¢	.....	M	50	M	None	60	.....
270	75	725	6	700	6	97	100	50¢	40¢	P	86	MP	.....	70	70
70	54	267	.....	264	.....	99	.....	.....	.....	.....	50	.....	.....	40	110
.....	.....	275	.....	3	.....	1	.....	.....	.....	.....	46	M	.....	50	90
50	26	293	3	7	3	3	100	33¢	11¢	M	43	M	$50	67	76

the Water-Supply Statistics, 1925 Municipal Index

.....	.....	6,678	.....	1,450	.....	22	.....	25¢	12¢	.....	246	P	$27	.....	.....
1,500	160	2,634	.....	1,052	.....	58	.....	25¢	15¢	M	182	M	None	73	73
300	60	1,185	15	1,185	15	100	100	60¢	42¢	H	93	M	.....	65	65
1,250	125	2,100	30	600	30	29	100	45¢	10¢	P	164	P	$50	130	130
40	3	125	2	125	2	100	100	25¢	23¢	M	20	M	.....	40	50
1,400	78	4,104	.....	3,580	.....	87	.....	31¢	.....	.....	197	.....	$30	45	65
275	49	850	10	500	10	59	100	33¢	18¢	H	95	M	None	60	150
13,900	107	21,000	.....	.....	.....	100	100	30¢	8¢	.....	1,142	M	None	30	80
580	38	2,608	.....	2,471	.....	83	.....	45¢	15¢	H	366	M	$20	101	111
9,800	140	.....	.....	.....	.....	.....	.....	.....	.....	.....	84	.....	None	35	35
1,364	90	4,738	.....	4,235	.....	89	.....	20¢	9¢	M	306	M	$40	65	85
28,700	60	102,005	1,007	99,807	1,007	100	100	34¢	28¢	P	3,325	MP	$6.50	90	.....
300	38	900	.....	800	.....	89	.....	25¢	15¢	M	37	M	.....	58	100
2,500	500	.....	.....	.....	.....	.....	.....	.....	.....	.....	60	P	$42	75	75
20,000	300	20,000	.....	.....	.....	.....	.....	.....	.....	.....	1,450	.....	$12	38	50
4,900	100	7,250	.....	7,250	.....	100	.....	20¢	13¢	.....	705	.....	None	35	90
969	85	1,700	.....	1,028	.....	61	.....	35¢	5¢	MH	185	M	$55	68	90
4,500	82	11,100	.....	11,000	.....	99	.....	25¢	10¢	.....	587	P	$12	35	52
600	107	1,083	.....	1,083	.....	100	.....	40¢	20¢	M	75	M	.....	45	100
1,500	100	2,500	75	2,500	75	100	100	.....	.....	M	300	M	.....	58	58
2,500	276	1,835	.....	.....	14	99	1	20¢	6¢	P	77	M	.....	65	90
1,657	77	4,068	.....	4,038	.....	98	.....	25¢	10¢	M	477	M	.....	40	100

Fighting Crime with Tear Gas

By Edward J. Brophy
Superintendent of Police of Pittsburgh

THE police of the city believe in always being prepared for emergencies. We are also firm believers in keeping abreast of the times and taking advantage of modern appliances and inventions for the suppression of crime and the protection of our officers from injury or death. That is the real reason why tear gas has been adopted in the Bureau of Police of Pittsburgh as one of our very strongest weapons in times of trouble or in individual cases of lawlessness.

While the street-car strike of recent date was at its height in Pittsburgh, and indications were that mobs would form and attempt to interfere with the operation of cars, we were at our wits' end. Disturbances were threatened by the bringing in of hundreds of strike breakers, who were quartered in different sections of the city. The majority of them were known to us to be desperate characters, who would make trouble if the occasion came. The street-car men were also in an ugly frame of mind. Many of the people of the city were in the same mental attitude and willing to assist the strikers in securing their demands. The adoption of tear gas seemed to be the only way out of a serious difficulty if the strike were to proceed and a strenuous attempt were made to break it.

The tear gas experts said that lawlessness and mob rule could be promptly suppressed by using tear gas. We made a number of experiments, and a few hours' study of tear gas and its effects when used by the appliances that are now available for every police department, convinced us of its efficiency.

Fortunately, the strike was settled without any serious outbreaks. Nevertheless, we were prepared. We believe in preparedness at all times, it might be said. After the city had resumed its normal state because of the settlement of the trouble, we started elaborate experiments with the tear gas to have men ready to use on it when occasion demands.

Training the Tear Gas Squads

Members of the tear gas squad, known as the "bombing squad," were picked from the officers in the police bureau. All were strong, athletic fellows with baseball and football experience. They were placed in charge of Lieutenant Thomas Cavanaugh, of the vice squad, and Captain Young, both of whom had considerable experience with all kinds of poison gases while in war-ridden France.

The training was of an intensive character. As a result, this squad, or, we might say, any individual member of it, would be able to stand off a crowd of gangsters, until assistance arrived, with one of the tear gas maces with which we propose to equip men in districts known to be dangerous. With a few men carrying tear gas bombs, we have absolutely no fear of any mobs getting very far in this city. If one were formed or any other similar trouble should break out, it would require but a few minutes for us to disperse and capture the disturbers of the peace.

Tear gas positively reduces a lawbreaker to a state of helplessness. He is easier to handle than a few-days-old infant, once he is given an easily administered dose of tear gas. An important advantage of tear gas is that it does not have any injurious effect on persons breathing it. In dispelling mobs, therefore, if innocent persons are affected by the gas they are only temporarily inconvenienced.

To the best of my knowledge, tear gas as a protection against crooks and bandits has been adopted by at least 300 cities, small towns, and communities in the United States. We have yet to hear of a single instance where it has been tried and has not proved effective. Improvements, of course, in the appliances and the ejecting of the gas are bound to come with time, but even at this stage of its development, tear gas is the most effective threat and weapon against the hold-up man and bandit.

Realizing this fully, all of Pittsburgh's police lieutenants and sergeants are to be given a thorough course of training with tear gas in a short time. In fact, the classes are in process of formation now. In turn, the lieutenants will drill their men, and within a few months we expect to have our police force so efficient in the use of tear gas that they will be able to stand off an army of thousands, if the occasion demands.

For authoritative discussions of the general problems of Police Administration and of the Administration of Justice in the Modern City and County, see articles under those titles, by Arch Mandel and E. H. Sutherland, respectively, in THE MUNICIPAL INDEX *for* 1925, *pages* 77 *and* 192.

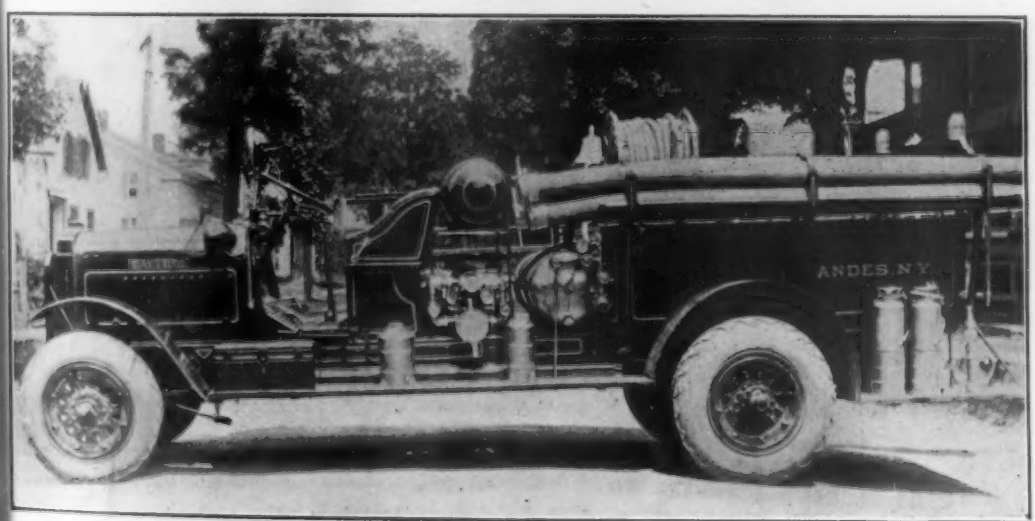
Tractors and Trucks Serve Cities

CLEANING UP THE CITY DUMP IN CLEVELAND, OHIO, WITH A TRACKSON FORDSON

This dump, which occupies one-half of a city block, was leveled over in 6 hours with this equipment, which resulted in the purchase of a unit by the city. The sale was made by the Tractor Sales Company of Cleveland

What Motors Contribute to Municipal Service

The rapid growth of American cities in the last two decades has placed many new burdens on the various municipal departments whose functions are the protection of life and property, the conservation of health, and the comfort of the community. This expansion has brought into use every means possible for the more speedy functioning of all municipal departments. The haulage problem in a community of any size has far outstripped the physical capacity of the draft animal, so that motor trucks are now the backbone of transportation for municipal departments. Horses cannot exceed a speed of 6 miles per hour for any considerable period. Their load is limited and at the end of the day fatigue makes them useless for emergency work, which is so frequent in fire, police, water, hospital, and electric departments. In these particulars the motor truck has many points in its favor. Its speed is greater. Its load is larger, and fatigue at the end of the day's work does not limit its usefulness.—The Municipal Index for 1925.



NEW FIRE EQUIPMENT IN SERVICE AT ANDES, N. Y.

This fire truck is a Day-Elder 3-ton chassis equipped with a Childs Type D pump, capable of delivering 500 g.p.m. at 120 pounds pressure. The equipment includes one 40-gallon chemical tank, 200 feet of chemical hose, mounted on an automatic hose reel, ladders, extinguishers, axes, crowbars, pike poles, search-light and 1,000 feet of 2½-inch double-jacketed hose

A CLAY MODEL OF THE AREA OF A PROPOSED IMPROVEMENT, SHOWING THE CHIP-BOARD FOUNDATION OF THE MODEL

The deep shadow at the left is the bed of a stream. Height of cliff at right, 62 feet. Model at 1/8 scale

Model-Making to Help Visualize Proposed Improvements

By Florence Holmes Gerke

Bureau of Parks, Portland, Ore.

THE average person's understanding of an engineering or technical plan of any kind is practically nil. In municipal work where a proposed improvement or innovation must be understood by the public, it is highly desirable that some quickly-grasped form of delineation be arrived at if the idea proposed is to have the popular interest and approval. While the colored sketch stimulates the imagination, it is sometimes more imaginative than authentic, and often results in giving the uninitiated hopes more rosy than feasible. On the other hand, the profile, topographical map or geologic survey is a sterile field for the layman.

In the Bureau of Parks of Portland the model has been made the vehicle for ideas of designers and officials who desired to give those ideas to the man who is not an expert. C. P. Keyser, Superintendent of Parks, has employed the model in several instances with excellent results, for the novelty and accessibility of the method have at once brought response.

Model-making as evolved in the Bureau has been worked out quite simply. The work can be done by any skilled draughtsman or person with an eye for elevations and with a certain facility in handling the clay or other pliant material. Most of the models for the Bureau have been of large areas, such as golf courses, wild parks and country properties.

The foundation material is generally of heavy cardboard, the thickness of the paper representing one or more feet, according to the scale selected. It is important that the chip board or other cardboard run fairly true to thickness, as a variation would accumulate and the error in elevation might be appreciable after two or three score papers had been piled up. The model may be built on true scale or it may be exaggerated if it serves the purpose more readily. Ordinarily, the model is made in true scale. A pantograph is most convenient for transferring the scale from the map to the cardboards. The cardboard may be cut with a linoleum knife or other sharp, short knife. The cut-out pieces are shellacked and then nailed together with one-inch brads so that they are doubly secured against warping in change of weather or upon application of wet clay. It is customary to build those models which are to be used in detail, somewhat below grade, in order to cover the cardboards with a material such as clay or parafine.

Delineating a Golf Course

When the model is not to be surfaced with

any plant material in carrying out fine detail, it is simply shellacked to prevent warping. The Bureau used this method on a golf course in which it was desirable to study the relation of holes and tees and to show the thing to sportsmen who were interested in the proposed course. The players were interested to know just how much difference there was in elevation between tees and holes and to understand just how "sporty" the course would be. As they had already walked over the ground and were familiar with the trees and shrubbery masses, it was not necessary to go into the development of the model beyond giving the shape of the ground. The picture of this stark, uncompromising pile of cardboards was printed in the local papers and was discussed and understood by many who would have been completely bewildered by the ordinary contour map.

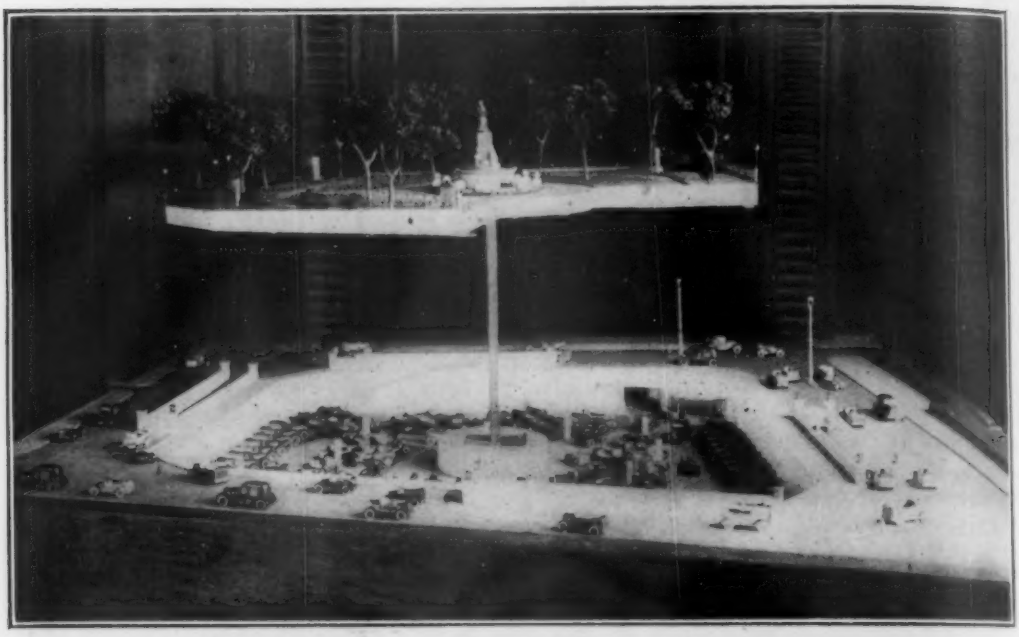
Another model was that of a piece of wild country to be acquired as a public reserve. This was fashioned in cardboard and wax and then a plaster cast was made. On this cast the property lines, highways and special scenic points were marked out. The model was used in a condemnation suit and served the jurors and court in a concrete manner. Although the jury journeyed to the site, it was so rough and inaccessible that many were engrossed in extracting themselves from blackberry vines and in clinging to stony cliffs and could not have given their undivided attention to the boundaries and features of the place. Many of them doubtless formed much of their opinion of the whole place from the model in the courtroom.

In the study of special details, the model has been used effectively. It was desired to place a building on a certain extremely scenic

A FINE ENGLISH EXAMPLE OF MODEL-MAKING

This model of the proposed Brentford By-pass Road was shown at a recent town planning exhibition in England. The model was constructed by S. D. Adshead, Professor of Town Planning, of London University, and his pupils. The following explanation is published in "Garden Cities and Town Planning," to which The American City is indebted for the photograph:

"The photograph is taken looking west. Over against the river at the point where it is named will be seen the notorious bottle-neck, the Brentford High Street, and on the right the Brentford Gas Works and the Metropolitan Water Board's reservoirs. The extreme costliness of a scheme for widening the old road throughout its length is made very obvious by the model, as is the essential practicability of the by-pass, which will carry the through-traffic to the north of the built-up area to join the western avenue in open country."



MODEL OF A PROPOSED UNDERGROUND PARKING PLACE FOR CARS AT LEICESTER SQUARE, LONDON
The model provides that cars and motor-cycles would enter and leave at the near side of the road, and thus avoid crossing other lines of traffic. All the parking space would be available without any crossings, as traffic will circulate one way only. Stairway communication between the Square and the underground parking space will be necessary for the convenience of drivers who have parked their cars or are returning to them

and beautiful spot, and the park officials hesitated to locate a structure in any manner which might mar the general scene. In addition, the approval and enjoyment of the public in the location and character of the building was important. A clay model at one-eighth scale was made of the site, and a model of the building superimposed on the clay. Many interesting things were revealed to the architect, landscape architect, and park officials. The site is still being studied and the result promises to be worthy of the natural landscape.

A Chamber of Commerce Display

One of the Park Bureau models was placed in display in the Chamber of Commerce and received much attention at the annual flower show. It was a model of the proposed municipal rose garden, done in gay colors with tiny structures representing pavilions, pergolas and other features. The model was a plaster cast, shellacked and painted with oil colors. Buildings were of cardboard painted with cold water paints which represented stucco.

The model is as simple or as intricate as the needs require. It has the double worth of presenting the idea to the layman and of showing the designer his idea in three dimensions. Although it is the custom for the expert to visualize the completed project from maps and other drawings, it is surprising to find how much is discovered in the relation of parts to the whole in the new method.

Whenever a project needs some campaigning to raise special funds for development, or when some entirely new project is to be put before the public for its support, the model has its uses. The diminutive buildings, streams and forests have a charm apart from their instructive value. This is always noticeable at fairs and exhibitions where people crowd about a model house or ship or flower garden with great interest. A working model of a bit of machinery is fascinating to persons who have no idea of the use of the machine. The models which appear at Christmas time depicting joyous home life, in sugar and gingerbread, are the child's idea of all that a model should be. Almost any taste and mind may be intrigued by a model, and when the first interest is caught, it should not be difficult to secure a more permanent hold on the mind.

Park departments which have no person on the staff who is skilled in model-making should not be hindered from employing this method of telling their story. In almost every city of size, workers who have mastered the art of making models may be found and their services requisitioned. In the largest centers of population are persons famous for their skillful miniatures. The purpose of the model will determine where it should be made.

Chamber of Commerce Activities in Public Affairs

"Tiny Town" and Its Administration

SPRINGFIELD, MO.—The miniature modern city of Tiny Town, constructed by the school children of Springfield, was presented to the public, under the auspices of the Chamber of Commerce of this city, from May 25 to June 13. The exhibition attracted wide-spread interest, and people from many parts of the country were numbered among its visitors.

This model city is not only complete in all details of plan, construction and equipment, but is ruled by the commission-manager form of government, the city officials having been duly elected from Springfield's student body through a primary and regular election. The children conducted a realistic political campaign, with eighteen nominees presented for the offices of City Manager, Mayor, and Police Judge. The City Manager and Mayoress were favored with a trip to the national capital, where they called on President Coolidge, presenting him with an invitation to visit Tiny Town. Through the practical experience which they gain in governing their miniature city, supplemented by the special attention which the Springfield schools are giving to the subject of municipal government, it is believed that the boys and girls of this city will become particularly well fitted to take an intelligent interest in governmental and political affairs.

All the buildings of Tiny Town have been constructed on a scale of one inch to the foot. They include many homes, a community center, a business district with offices, banks, stores, and factories, churches, schools, a Y. M. C. A., a Salvation Army headquarters, etc. The grounds have been laid out with suitable plants and shrubs, and miniature electric light standards have been installed on the thoroughfares.

In addition to the buildings, the children made many tiny models of the interiors of rooms, com-

THE MAYORESS, CITY MANAGER, AND OTHER OFFICIALS OF TINY TOWN, SPRINGFIELD, MASS.

A VIEW OF TINY TOWN, SHOWING CONTRAST OF HUMAN BEINGS WITH THE ONE-INCH-TO-THE-FOOT SCALE OF THE BUILDINGS

plete with furniture and hangings, and prepared posters and scrap-books of their own designs for buildings and rooms of all kinds. Cash prizes amounting to $1,500, offered by the Executive Board in charge of the enterprise, were won by the youthful builders whose work was deemed worthy of special merit.

Realtors and others engaged in the industry of home building and decorating report that their business has received a considerable impetus as a result of the interest in homes aroused through the building of Tiny Town.

RUSSELL E. SMITH.

EDITORIAL NOTE.—The Tiny Town idea originated in Springfield in 1919. The first event was described in THE AMERICAN CITY for September of that year. This second edition of the miniature city has been built on a much more elaborate scale.

Band-Stand and Comfort Station Erected; Abandoned Cemetery Transformed into Park

BRADFORD, PA.—The newly erected band-stand and comfort station in the public square of Bradford is evidence of the constructive work of the local Board of Commerce and of the progressive spirit of the community as a whole.

The city government, as its share in the project, undertook to make the necessary excavations and to complete the job up to the level of the ground. From this point the work was financed through a fund of $5,000 raised by popular subscription in a campaign promoted by the Board of Commerce. The structure is hexagon-shaped, measuring 24 feet across, and the underneath section has been equipped as a comfort station. The accompanying picture gives a good idea of the attractiveness of the band-stand, although the finishing touches on the exterior of the building have not yet been completed, nor the surroundings entirely cleared of rubbish, and shrubs planted.

Another example of the work of the Board of Commerce may be found in the transformation of an abandoned cemetery in the heart of the city into a park and playground. This land, which lay along the right of way of the Erie Railroad Company, was purchased by the Board of Commerce, and when the work of beautification, now well under way, is completed, the park will be presented by this organization as a gift to the city. Through the solicitation of the Board of Commerce, the sum of $15,000 to finance this project was donated by one of our members, William Hanley. In recognition of this splendid gift, the new recreation ground will be named Hanley Park.

RAYMOND WOODRUM,
Executive Secretary, Bradford Board of Commerce.

BAND-STAND AND COMFORT STATION IN PUBLIC SQUARE, BRADFORD, PA., WITH TULIP BED IN BLOOM

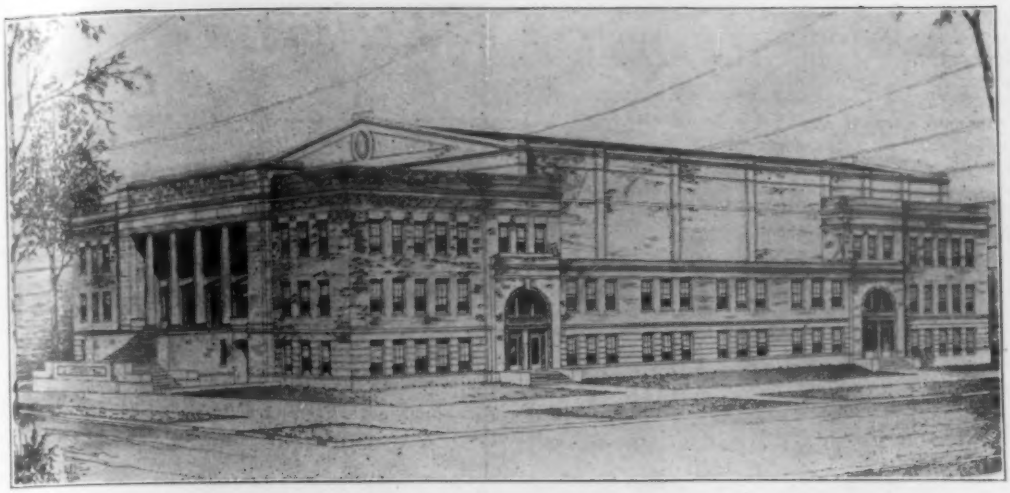
School Bonds Voted 34 to 1; Commissions to Traffic Officers Abolished

BLUEFIELD, W. VA.—In a recent special election the citizens of Bluefield expressed themselves as very definitely in favor of the proposal to issue bonds totaling $600,000 for the erection of new school buildings, and the Chamber of Commerce justly feels that the "Get Out the Vote" campaign which it organized and carried out in connection with the election, contributed largely to the success of the issue. In spite of unfavorable weather, an unusually large vote was registered, and the school bonds carried by the remarkable majority of 34 to 1 in the entire school district, and of 57 to 1 in the city precincts of Bluefield. This city is inclined to claim that this majority vote establishes a national record for municipal bond elections. One precinct had the unique distinction of having cast 394 votes in favor of the issue and none against.

It is planned to use these funds to rebuild the high school which was destroyed by fire in the spring of this year, and to establish three new junior high school buildings. As soon as these junior high schools are ready for use, Bluefield will operate on a schedule of six years of grade school, three years of junior high, and three years of senior high, in place of the present system of eight years of grade school and four years of high.

The complete abolishment in West Virginia of the commission system of paying state traffic officers is another achievement for which the Bluefield Chamber is in a large measure responsible. Complaints had constantly been received of the indiscriminate arrest of motorists in this city for minor violation of the traffic laws by the state traffic officer, whose livelihood depended on the number of convictions he secured. The Chamber, in cooperation with the Bluefield Automobile Club and other local organizations, brought the matter persistently to the attention of the State Road Commission and of the Governor, with the result that not only was the state officer in this section removed, but the commission system was abandoned throughout the state.

CONRAD BREVICK,
Secretary-Manager, Bluefield Chamber of Commerce.



MEMORIAL BUILDING AND CITY OFFICES, CHANUTE, KANS.

Combined Memorial Building and City Hall

CHANUTE, KANS.—A fine structure which will be used as a combined memorial building and city hall is now nearing completion in this city. It will provide the community with an auditorium having a seating capacity of 2,000, and will serve as the headquarters for many local organizations. The Chamber of Commerce plans to make its home in the new building, and other rooms have been set aside for use by the American Legion, the G.A.R. the Spanish War Veterans, the County Farm Agent, women's clubs, etc.

Chanute owns its own gas, water and electric light plants, and the business offices and departments of these utilities, as well as the police and fire departments, will be housed in this building.

The cost of erecting this memorial building, which occupies an entire block in the heart of the city, amounts to about $350,000. The city has met this expense by a bond issue, supplemented by the proceeds of the sale of the property formerly used as a city hall and some surplus funds representing profits from the operation of the municipal gas plant.

C. R. LARRICK,
Secretary, Chamber of Commerce.

Protection Against the Fake Stock Promoter

GLOVERSVILLE, N. Y.—One of the most valuable services of a community-wide nature that has been rendered by the Gloversville Chamber of Commerce has been accomplished through affiliation with the Investors' Protective Service of the Wm. J. Burns International Detective Agency.

This Chamber of Commerce was one of the first subscribers to the service after it was instituted, and since that time we know, through direct contacts, that we have been able to save this community a sum totaling many times the amount of our annual budget. How much more has been saved indirectly as a result of our efforts to combat the sale of fraudulent stock cannot of course be computed.

The beneficial effects on the life of a community of such a protective service are so far-reaching as to make the activity worth the consideration of chambers of commerce and other local civic and commercial organizations throughout the country. And as a result of our experience in Gloversville we are inclined to believe that only through the help of an agency such as that with which we have affiliated, can any organization be prepared to offer the efficient service in this connection which the public so greatly needs.

There are some citizens in Gloversville who are of the opinion that had the Chamber of Commerce rendered the community no service other than that of protection against the fake stock promoter, the existence of the organization would be wholly justified.

ROBERT H. STROUD,
Manager, Gloversville Chamber of Commerce.

Helping Negro Farmers to Apply Modern Agricultural Methods

HOUSTON, TEX.—Through its cooperation with the Extension Department of the Texas Agricultural and Mechanical College, the Agricultural Department of the Houston Chamber of Commerce has achieved a marked degree of success in demonstrating among the negro farmers of Harris County the value of properly applied modern farming methods.

Finding it difficult, and in many cases almost impossible, to convert the old-time farmer to up-to-date methods of cultivation, the Chamber has directed its efforts largely toward the boys and girls rather than to the grown-ups, not differentiating between the white and black races in the distribution of its services, but providing in all cases demonstrators for both the farm and the home. Most gratifying results have been obtained in a number of cases where the efforts of boys and girls, applying approved cultural methods under the direction of trained demonstrators, have yielded agricultural products vastly superior to those of their fathers, working on the same kind of soil and under identical weather conditions.

Among the older farmers, particularly notable results have been achieved in the case of two negroes whose farms serve as striking examples

to the people of the county of what may actually be accomplished when they accept the tutoring of demonstrators of their own race who have had the advantage of agricultural training in the colleges of this state, supplemented by the supervision of representatives of our Agricultural Department.

Judging by the outcome of its work along this line in Harris County, the Houston Chamber is convinced that could similar endeavors be carried out in other sections of the South, one phase of the difficult negro problem would largely be eliminated.

BURT RULE,
Publicity Director, Chamber of Commerce.

An Inspiration

America First

Not merely in matters material, but in things of the spirit.

Not merely in science, inventions, motors, and skyscrapers, but also in ideals, principles, character.

Not merely in the calm assertion of rights, but in the glad assumption of duties.

Not flaunting her strength as a giant, but bending in helpfulness over a sick and wounded world like a Good Samaritan.

Not in splendid isolation, but in courageous coöperation.

Not in pride, arrogance, and disdain of other races and peoples, but in sympathy, love, and understanding.

Not in treading again the old, worn, bloody pathway which ends inevitably in chaos and disaster, but in blazing a new trail, along which, please God, other nations will follow, into the new Jerusalem where wars shall be no more.

Some day some nation must take that path—unless we are to lapse once again into utter barbarism—and that honor I covet for my beloved America.

And so, in that spirit and with these hopes, I say with all my heart and soul, "AMERICA FIRST."

From a Sermon by Bishop C. ASHTON OLDHAM
in Washington, D. C., September 7, 1924

THE *News Bulletin* of the New Orleans Association of Commerce reprints the wording of this card, with the following comment:

"Attractive display cards containing this inspirational message may be obtained from the Association of Commerce.

"The sentiment contained in the words so impressed the New Orleans business men who first saw the card, numerous requests for copies have been received.

"To accommodate those who want copies, a small supply has been ordered from the publishers—The National Council for the Prevention of War [Washington, D. C.]—and may be had for framing upon payment of the cost, 10 cents."

Health Questions for Your Town

(Suggested by Haven Emerson, M.D., in *The Survey*)

Have you in your city the following?

Five beds for general medical and surgical patients for each 1,000 of population.

One bed for each death from tuberculosis per annum.

Beds enough to give 25 per cent of the births hospital care for three weeks.

Beds in convalescent hospitals for 10 per cent of the patients admitted to general hospitals.

One bed for every 2,000 of population for the acute communicable diseases of childhood.

One visiting public health nurse for each 2,000 of population.

A medical social service worker for each 100 patients attending special heart clinics, to provide home instruction and guidance.

Sorting stations for the unusual, the problem, the ill-adjusted, the predelinquent child.

A prenatal service connected with every hospital that receives maternity patients.

Courses to Be Given at the National School for Commercial and Trade Executives

AS previously announced in THE AMERICAN CITY, the 1925 session of the National School for Commercial and Trade Executives will be held at Northwestern University, Evanston, Ill., July 20-August 1. A preliminary outline of the courses of instruction has been issued. Those of special interest to secretaries of civic-commercial organizations include:

Psychology
Effective Speaking
Principles of Economics
Economic Problems of Agriculture
Public Finance and Taxation
Marketing and Distribution
Effective Writing
Traffic and Public Utilities
Handling Matters with Legislative Bodies
Interpretation of Business Financial Statements
Research Work and Its Purpose and Fundamentals
Organization and Planning of Work
Effective Committee Operation
Membership Building and Conservation
Organization Finances and Business Management
Organization and Community Publicity
Principles Underlying Secretarial Efficiency
Chamber of Commerce Salesmanship
Meetings of Members—Types, Methods, and Principles Underlying Success
Office Administration
Commercial Activities
Industrial Activities
Civic Activities
Industrial Research and Development
Management of Chamber Having a Small Staff
Charities, Solicitations, Community Chests
Retail Trade Development
Safety Activities
Traffic and Other Street and Highway Problems
How to Deal with Frauds

The tuition fee for the two weeks is $30. Dormitory accommodations are available at the University at reasonable rates. For further details address John N. Van der Vries, Secretary, Board of Managers, 10 South La Salle Street, Chicago.

Chamber of Commerce Leadership in Health Work

SPEAKING before the annual convention of the Southern Commercial Secretaries Association, in Biloxi, Miss., on June 16, Dr. Oscar Dowling, President of the Louisiana State Board of Health, cited the extinction of yellow fever and plague, and the campaigns for rat and mosquito extermination, as outstanding examples of how the prestige of chambers of commerce in the past has been directed towards the improvement of public health. In urging continued and increasing interest of civic-commercial organizations in public health problems, Dr. Dowling said, in part:

"Such influence must not be allowed to lapse or lose its driving force. In emergencies it must stand the test of opposition from the unintelligent groups, and even when there are no emergencies, salutary measures must be upheld with vigor and persistence. A knowledge, preceded by a study of the individual problems of your city, will constitute the motive for your actions. You can rest assured that if you prosecute your campaign for social betterment, which implies industrial improvement, you eventually will be successful and you will reap the benefits of your initiative.

"I shall mention one other health problem in which I am not sure these associations have heretofore exhibited as much interest as they should; I believe largely because the members are not acquainted with the facts. I refer to the ever present danger to this and to future generations from the venereal diseases and juvenile delinquency.

"We have no adequate data with which to judge the extent of the pernicious influence of these destroyers of health and good morals. Nevertheless, they are present, and our morbidity statistics for the past year place them second on the list of infectious diseases, i.e., the venereal diseases are only superseded in point of prevalence by the highly contagious influenza.

"Then too, are you aware of the degree to which prostitution exists? I doubt that you are. Neither am I, for public funds are not available to fully ascertain this important phase of the venereal problem.

"Venereal disease and delinquency of both sexes are closely correlated. Prostitution is either public or clandestine; there is much of the latter. Both are almost exclusively responsible for venereal infections. There is a solution to the prostitution and venereal disease problems; it lies mainly in exciting public opinion to back up our efforts.

"In order that this public opinion may be enlightened, influential groups of intelligent people must present the matter to public notice, and must signify their approval of health measures by active cooperation and by fearless expression in the daily press.

"The first essential, however, is a social survey—made, of course, by discreet persons of both sexes who have had the necessary experience. The next step is the consideration of a definite line of action to be taken when the data presented by the investigators has been thoroughly analyzed. I hardly think that any among you would then deny that something could be accomplished and that it should be done to prevent boys and girls, men and women, and the innocent offspring of syphilitic parents from being the victims of public negligence.

"As a final suggestion, I urge you to become conversant with the problem of drug addiction. It contains many exasperating angles, not the least of which is drug peddling in disguise. The street vendor is the most frequent though not the only source of the illegal drug supply, and he is but the parasite of the drug smuggler. You can do a great deal to assist the Federal officers to abolish this nefarious traffic, if you will study the situation and after due deliberation bring pressure to bear where pressure is needed."

Chambers of Commerce Cooperate with Police and Fire Departments in Fighting Arson

IN a recent report urging local chambers of commerce, in the study of the fire losses in their respective communities, to give particular attention to fires of questionable or suspicious origin, the Arson Committee of the National Fire Waste Council mentions Philadelphia and Detroit as examples of the reduction of incendiary fire loss through the interest and cooperation of various law-enforcement agencies and local authorities. To quote in part:

"In 1920, the fire loss of Philadelphia amounted to approximately $9,000,000, and it was generally believed that incendiarism and arson had contributed considerably in this loss. The Insurance Commissioner of Pennsylvania, the Fire Marshal of the city of Philadelphia, insurance clubs, and business men's organizations, interested themselves in a general campaign against incendiarism and the reduction of the fire loss in this city in the past two or three years is believed to be due to a partial suppression, at least, of fraudulent fires.

"The gradual and material reduction of the fire loss in the city of Detroit in the past three years has also been noted with satisfaction by the people of the city and by others interested in the suppression of arson and fraudulent fires. Probably the most potent factor in the reduction of this loss in Detroit is the activity of the Arson Squad in the Detective Bureau of that city."

For the pictures of "fire machines" here re-

NEWPORT CULVERTS

Made of genuine Gohi Sheet Metal (Genuine Open Hearth Iron) successfully meet the most exacting

Rust Resisting

specifications of Architects and Engineers because they are made of pure iron-copper alloy. Exposed to the elements or corrosive agents they are practically immune because of their

Enduring Quality

The above is a photographic reproduction of an 18-in. Newport Culvert installed in the Autumn of 1912 under the roadway of the S. C. & C. Ry. This culvert is still in splendid condition.

Newport Culverts made up in various sizes, round or half round, in lengths up to 20 feet, will meet the requirements of any installation. They will neither crack, become disjointed, nor disintegrate.

Write for valuable information sent free.

The NEWPORT CULVERT CO.

533 W. 10th Street **NEWPORT, KENTUCKY**

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produced, THE AMERICAN CITY is indebted to Lent D. Upson, Director of the Detroit Bureau of Governmental Research, and to George W. Smith, Detective of the Detroit Police Department Arson Squad. The report of the latter shows a four-year record of incendiary fires in Detroit as follows: 1921, 111 fires; 1922, 59 fires; 1923, 30 fires; 1924, 47 fires.

How the Detroit Arson Squad Operates

The *Quarterly* of the National Fire Protection Association describes Detroit's campaign against arson:

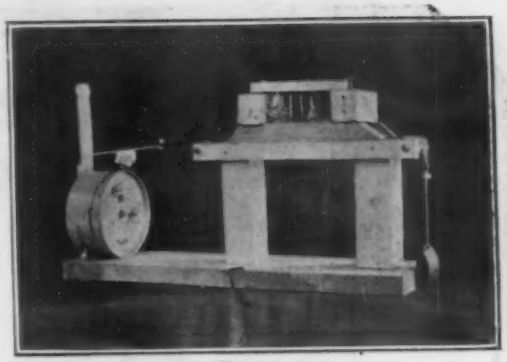
"The awakening of the city to its responsibilities occurred in 1921 following the public disclosure of the operations of the Morris Coleman gang, whose leader confessed that he alone had set 17 fires on a contract basis. This dupe and accomplice, whom the newspapers, following their usual custom of exploiting any kind of success, admiringly called the 'arson king,' is now in the state penitentiary at Marquette and his organization of 38 confederates dissipated, presumably into individual operators.

"The intelligent manner in which the police and fire departments of Detroit planned to cooperate in the control of arson as soon as they were convinced that an awakened public opinion would approve of and sustain their efforts deserves to be recorded.

"On November 1, in the year 1921, Commissioner of Police Frank H. Croul appointed detectives Howard L. Seiler and George W. Smith as members of an arson squad. These men were relieved from other work in the police department and assigned to the investigation of fires exclusively. The men were given a small office in which they might interrogate witnesses.

"The fire commissioners of Detroit issued instructions to all of the battalion chiefs of the fire department to make a close survey of every fire to ascertain whether the origin was incendiary, suspicious, or purely accidental. The fire department was notified in the event of suspicion as to the origin of any fire, or in the event that there was any physical evidence to show that the loss was incendiary, that the police department might in turn be immediately informed.

"Whenever a battalion chief calls the police department, and notifies them that a fire is of suspicious origin, whether it be night or day, uniformed policemen are sent to the scene to take entire charge of the building to preserve the evidence and to keep any one from entering the building until after the arrival of the members of the arson squad. On the arrival of Smith and Seiler, the watch may be maintained or it may be discontinued, according to the circumstances, but detectives Smith and Seiler at once begin a thorough investigation. If there is any physical evidence, or if photographs are necessary in order to show exact conditions, the city photographer is called and the premises are photographed. If necessary, the city engineer is called to make a drawing. Witnesses are taken to the rooms of the arson squad and interrogated; the testimony is transcribed; and, if it is deemed that a case has been developed, the detectives of the arson squad

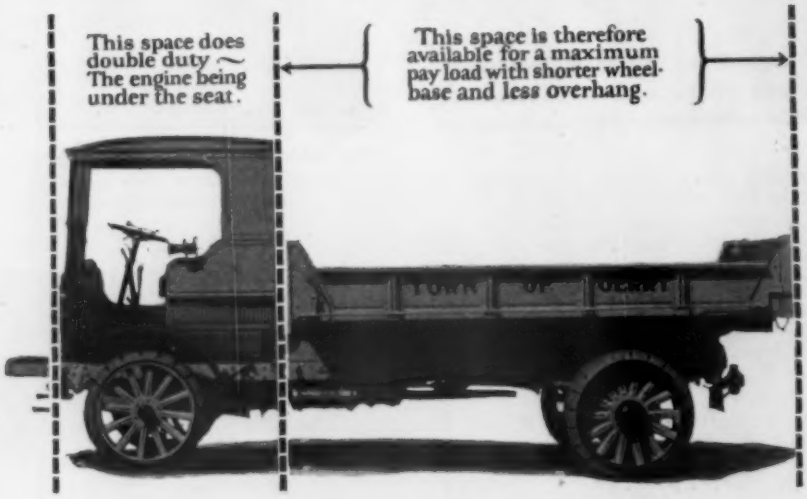


FIRE MACHINE FOUND IN AUTO BODY PLANT
It consisted of an alarm clock rigged up with supplementary apparatus

ONE OF THREE FIRE NESTS FOUND IN AN ATTIC OVER A BAKERY SHOP
Scrap lumber, paper, excelsior soaked with alcohol, and two celluloid combs with a candle between them

FIRE MACHINE USED TO START A FIRE IN A SPORTING GOODS STORE IN THE HEART OF DETROIT
An alarm clock, dry-cell batteries, a vibrator, and plenty of gasoline were some of its features

Waste space eliminated by Autocar construction


This space does double duty — The engine being under the seat.
This space is therefore available for a maximum pay load with shorter wheelbase and less overhang.

Autocar short wheelbase handiness saves time and lowers operating costs wherever municipal hauling calls for maneuvering in and around city dumps, disposal plants or cramped street paving jobs.

The Autocar Company, Ardmore, Pa.

ESTABLISHED 1897

Direct Factory "Autocar Sales and Service" Branches or Affiliated Representatives in

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Altoona	*Charlotte	*Fall River	Miami	*Philadelphia	*Schenectady	*Washington
*Atlanta	*Chester	*Fresno	*Newark	*Pittsburgh	Scranton	West Palm Beach
*Atlantic City	*Chicago	Harrisburg	*New Bedford	*Providence	Shamokin	*Wheeling
*Baltimore	*Cleveland	*Indianapolis	*New Haven	*Reading	*Springfield	Wilkes-Barre
Binghamton	Columbus	*Jersey City	*New York	*Richmond	*St. Louis	Williamsport
*Boston	*Dallas	Lancaster	*Norfolk	*Sacramento	*Stockton	*Wilmington
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*Brooklyn						York

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gas *and* electric trucks

EITHER OR BOTH - AS YOUR WORK REQUIRES

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cause the arrest of the suspect, who is given a preliminary hearing and either held for trial or discharged. All of the physical evidence is removed to police headquarters and sealed and marked for exhibit at the trial. The district attorney is furnished with a copy of the report and copies of photographs. All physical evidence is brought into court by the detectives so that it may be introduced as exhibits, and these detectives follow the case until its final determination. . . .

"The simplicity and economy of this Detroit plan of cooperation of the police and fire departments in the work of discouraging arson should appeal to the officials of all the cities of the country that are plagued by this hideous sort of crook. 'The fire bug,' says Detroit Fire Marshal Goldwater, 'is the meanest criminal of all. We have convicted men who for hope of a most beggarly financial gain have set fire to a flat with families having small children sleeping in apartments above.' Beside the obvious inhumanity of these crimes, their dread economic significance is that any one of such fires may burn an entire city . . . . Every city owes it to itself and to the country to move positively to stamp out this antisocial pest, the dire possibilities of whose crimes are so far beyond the imagination of the contemptible culprits whose cupidity incites them."

Traffic and Parking Regulation in the Down-Town District of Cleveland

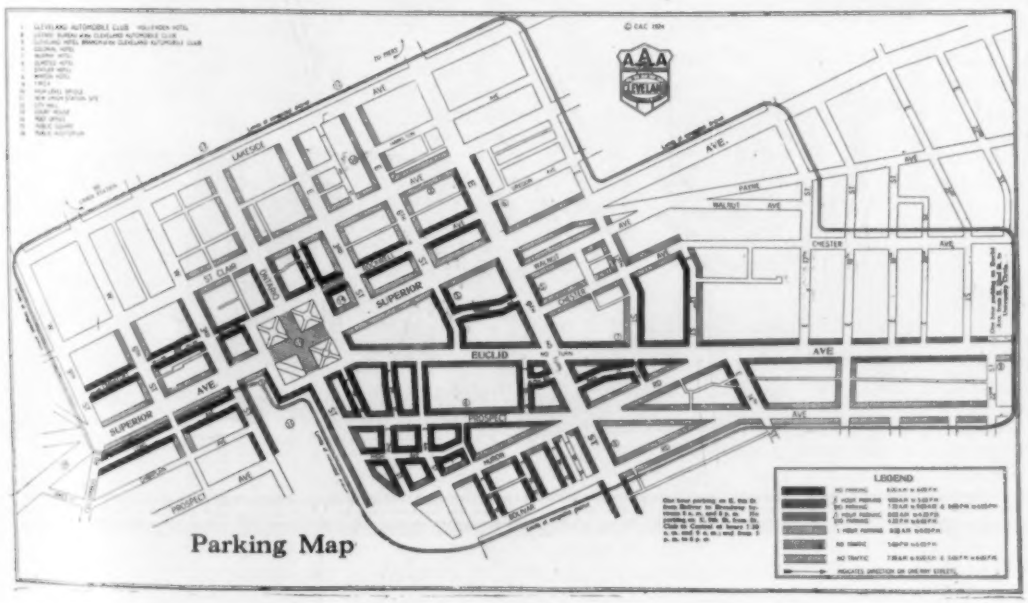
IN the matter of the government and regulation of vehicular traffic, the Cleveland Automobile Club has always cooperated with the city. Within the last few months, however, a number of definite steps have been taken by the Club as part of its own two-year program for the expedition of Cleveland traffic.

A traffic survey was conducted by the Club recently in eight of the large cities of the country, in which Traffic Commissioner Edward J. Donahue of Cleveland, Chief of Police Jacob Graul, and Cleveland newspaper men participated. New York was one of the cities where a detailed traffic study was made. After this trip, a lengthy report of the traffic conditions in the eight cities was submitted to City Manager W. R. Hopkins and members of the City Council, together with recommendations for Cleveland.

A traffic bureau has been organized by the Club for the purpose of cooperating with the Traffic Commissioner in the two-year program of traffic betterment, which includes the inauguration of a more modern system of control. This bureau will be operated by the Club until such time as a similar bureau can be organized within the traffic division of the Police Department, as was recommended by the Club after the 4,000-mile trip.

Since the organization of this new department, a synchronized system of traffic control has been installed on Euclid Avenue between the Public Square and East 18th Street, and plans are under way for the enlargement of this system to include every heavily traveled artery in the city. A number of modern parking regulations have recently been drafted at the suggestion of the Club, in addition to many minor changes which have been made for the ultimate benefit of Cleveland traffic conditions. The Club makes a monthly study of traffic accidents for the purpose of ascertaining the direct cause of the accidents, and a copy of the report is submitted to the Traffic Commissioner in order that he may know just what steps are necessary to correct the conditions that are resulting in traffic fatalities.

The diagram herewith reproduced shows the parking regulations in the down-town congested district of Cleveland. It is self-explanatory, except that in the original diagram differences in the hours for "one-hour parking" and "no traffic" as applied to certain blocks were indicated in red.



Parking Map

Taking The "Waste" Out of Waste Hauling

THE City of Minneapolis, in its work of garbage removal, is able to collect on a daily average, 769 tanks of refuse with thirteen Ford trucks at an operating cost of $1.19 per truck.

Such work is in keeping with the expanding conditions of city life and illustrates the necessity for adequate equipment to meet increased demands.

This hauling economy is typical of the advantage other cities enjoy through the use of Ford Products. Call on your nearest Authorized Ford Dealer and ask him to show you a Ford truck or Fordson tractor actually in work and explain the reasons for their economy and efficiency.

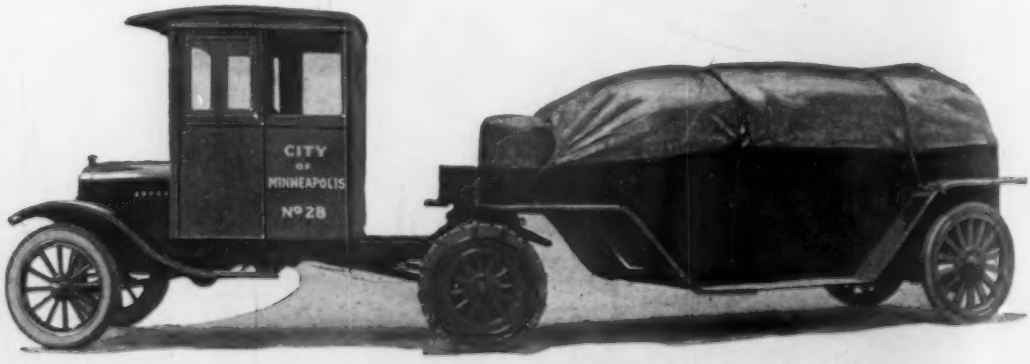
Ford One Ton Chassis—$365
f.o.b. Detroit

July 13th to 18th is Ford Truck Display Week

This week Authorized Ford Dealers everywhere throughout the United States will have on display and be prepared to give demonstrations of Ford trucks with all types of Ford-built bodies. It is an exceptional opportunity to learn how Ford equipment can bring a new economy into your business. You are invited to take advantage of it.

Ford

CARS · TRUCKS · TRACTORS



Hints, Helps and Happenings

This Month's Cover

THE front cover picture this month shows the combined Municipal Building and Community House of Highland Park, a suburb of Dallas, Texas. A description of the plans for this interesting building, written by former Mayor Henry R. Davis, was published, with a reproduction of the architect's sketch, in THE AMERICAN CITY for December, 1923. The completed building was recently opened with a special program arranged by a committee of which George B. Dealey, President *Dallas Morning News*, was Chairman. In addition to its use as a city hall, the new building will serve as Highland Park's "Meeting Place" for a series of monthly entertainments and other community features, and for exhibitions of paintings and other works of art.

Growth of the Community Chest Movement

THE National Information Bureau, of New York, acting as Executive Secretary for the American Association for Community Organization, reports that during the year ending May 31, 1925, 26 cities adopted for the first time the community chest plan for financing local philanthropic work. Out of 251 cities in the United States of over 30,000 population, 137 are now chest cities; in addition there are 62 places of less than 30,000 population employing federated financing. The amounts raised by community chests for years ending May 31 are given as follows: 1923, $39,468,214; 1924, $48,863,366; and 1925 (partly estimated), $54,700,000.

Jail Sentences for Drunken Drivers

THE Drunken Driver Contest recently conducted by the Automobile Legal Association, in which cash prizes amounting to $175 were offered for the three best 100-word statements on why drunken drivers should be given jail sentences, attracted wide-spread interest. Essays were received from people of all ages and professions living in forty states, and from the fact that there was only one dissenting statement among the hundreds received, it is evident that public sentiment on the whole favors the jail sentence as the most effective penalty for drunken drivers.

The first award of $100 was won by Miss Alice C. Gibney, Blackstone, Mass., whose statement, quoted below, was unanimously chosen as the one giving the best expression of reasons on the subject:

"Drunken drivers imperil the safety of children and law-abiding citizens, and deserve punishment. Effective punishment involves suffering. A fine does not punish those who can afford to buy automobiles and prohibitive liquor. Drunken drivers should receive jail sentences to teach them that liberty does not mean freedom to disobey laws; to inflict upon them suffering for their abuse of freedom; to educate them to respect the rights of others; to isolate them as agents destructive of human life and happiness; to convince them of the State's intention to safeguard her highways."

Suggestions by Safety Engineers for Traffic Accident Prevention

WHAT are considered the oustanding remedies for the traffic accident problem are contained in a report made public on June 7 by W. H. Cameron, Managing Director of the National Safety Council, whose engineers conducted a series of surveys in several cities which resulted in the following suggestions:

a. General Education of the public in traffic safety regulations and their voluntary observance, through such agencies as will reach all classes of the community inhabitants.

b. Better synchronized movement of all classes of traffic (vehicular and pedestrian) along main traveled thoroughfares and in densely populated districts, particularly at schools and playgrounds, by the installation of more means of traffic control, either officers or automatic signaling devices.

c. Making liberal use of signs and pavement markings to instruct the general public in the proper movement of vehicular and pedestrian traffic at specific locations—street intersections, curves, railway grade crossings, etc.

d. Permitting only those persons to operate vehicles upon the streets who are physically and mentally qualified to do so and whose record in law observance has been satisfactory.

e. Laying out, constructing and maintaining streets in condition for safe traffic movement.

f. Providing sufficient playground facilities, properly supervised and directed, to discourage children from playing in the streets, particularly in densely populated districts.

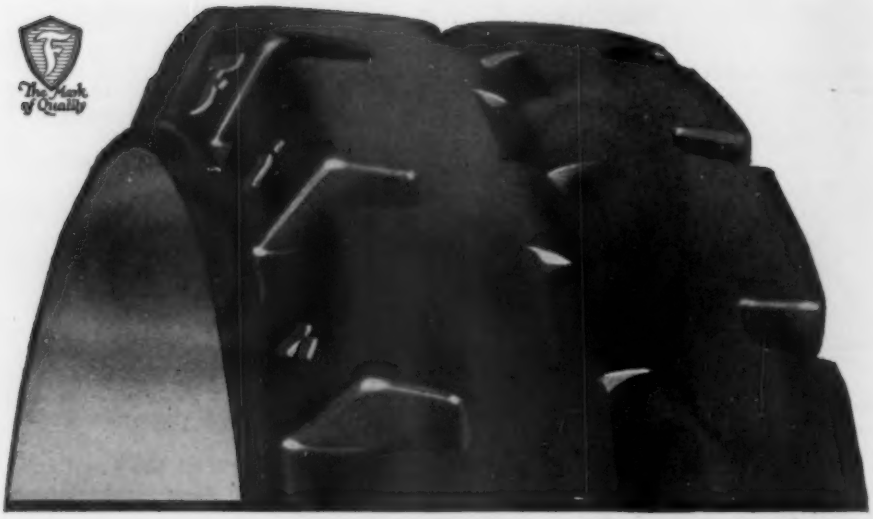
Police Favor More Drastic Restriction of Manufacture and Sale of Firearms

A RESOLUTION adopted at the 1925 meeting of the International Police Conference in New York:

"Whereas, the indiscriminate manufacture, distribution, sale, and importation of firearms capable of being concealed on a person is, we verily believe, the greatest potential cause of crimes of murder and other crimes of violence and an increasing menace to the safety of the citizen; and

"Whereas, the present state of the laws regulating the manufacture, distribution and traffic in deadly weapons is such that it is very difficult and sometimes impossible to prevent persons who are criminally inclined, criminals, and persons who are temperamentally both dangerous to themselves and others from procuring such arms; therefore

"Be it resolved, that this International Police Conference earnestly and urgently recommends to all governments that effective national, state, and municipal legislation be adopted prohibiting and regulating the manufacture, sale, and transporta-



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for Big Trucks—Heavy Loads—Hard Pulls

Double-Traction Tires—with 80 powerful road gripping cogs—are the tires for excavations and pit work. Applying every ounce of power to the road, the broad treads ride steadily over soft ground, carrying full loads.

The big volume of tough, lively rubber absorbs road vibrations and gives extra wearing depth. Designed by Firestone to permit natural flow of rubber, avoiding destructive traction waves.

There is a specialized Firestone Truck Tire for every hauling need—sold and serviced by established dealers in every trading center.

MOST MILES PER DOLLAR

Firestone

TRUCK AND BUS TIRES

AMERICANS SHOULD PRODUCE THEIR OWN RUBBER . . . H. S. Firestone

tion of firearms capable of being concealed on the person within the boundaries of their several cities or countries and that this Conference and each department member thereof earnestly urge and promote the enactment of such legislation by all legislative authorities throughout the world."

For Maximum Efficiency of Municipal Fire-Alarm Systems

AT the annual convention of the National Fire Protection Association, held in Chicago, May 12-14, 1925, an important report, presented by the Committee on Signaling Systems, covered detailed regulations for the installation and use of protective signaling systems used for the transmission of signals affecting the fire hazard, and regulations for the installation, maintenance, and use of municipal fire-alarm systems.

Especial emphasis is placed in the report upon the necessity of designing, installing, and maintaining municipal fire-alarm systems so that alarms may, at all times and under the most adverse conditions, be promptly transmitted to the fire departments. To this end, attention is called to the supreme desirability of providing headquarters which, as far as practicable, will be free from liability of damage by fire, either from internal or from external causes; of installing apparatus suited for promptly and correctly transmitting alarms, but simple of operation and easy of maintenance; of placing all wires outside of buildings, as far as practicable, underground; of having frequent and systematic tests of all apparatus; and of having in charge of such systems only men of known judgment and ability.

Copies of this report of the Committee on Signaling Systems can be secured from the headquarters of the National Fire Protection Association, 40 Central Street, Boston, Mass.

A conservative town learns from the past.

A live town thinks of the present.

A progressive town plans for the future.

AN IDEAL TOWN DOES ALL THREE.

Tremendous Wastes in School Ventilation

THAT existing ventilation legislation wastes $2,500,000 annually of taxpayers' money in the United States and is not only needlessly extravagant but actually injurious to the health of school children, is asserted by Dr. C. E. A. Winslow, Professor of Public Health of the Yale School of Medicine and Chairman of the New York State Ventilation Commission. The Commission was appointed by a former New York governor and supported by the Milbank Memorial Fund, of which Edward W. Sheldon, President of the United States Trust Company, of New York, is head.

In New York State alone, $200,000 of public funds are foolishly spent each year in the operation of school ventilation systems based on a disproved theory, writes Dr. Winslow in the June number of the *American School Board Journal*. Mechanical systems of ventilation based on this theory not only cost more to build but, once constructed, require the wasting of more millions in operation, says the writer.

The heretofore supposed need in room ventilation of allotting a minimum of 30 cubic feet of fresh air per minute to every individual occupant is not borne out by the Commission's findings. Upon this requirement, known as the "carbon dioxide standard," most modern ventilation legislation is based. Introduced in 1862 by Max von Pettenkofer and later adopted by the American Society of Heating and Ventilating Engineers, this standard has resulted in the enactment by twenty states throughout the country of laws making mandatory the installation of extravagant school ventilation systems, the article says:

"If this were all," Dr. Winslow continues, "if the harm done by mistaken theories of ventilation were limited to the pocketbook, the matter might be dismissed as one to be settled between public appropriating bodies and their own consciences. There is, however, a still more fundamental, and still more serious, aspect of the case."

Ideal room ventilation, it was found, is not obtained by pouring in a volume of warm air, but by providing a small amount of cool, fresh air to counteract the occurrence of a warm, moist, and still atmospheric condition. With an air supply of 30 cubic feet per minute, it is essential to maintain temperatures generally over 68° F. to avoid unpleasant drafts, writes Dr. Winslow. Such a warm atmosphere causes a rise in body temperature, an increased pulse rate and respiration and decreased blood pressure, and results in markedly diminishing one's working efficiency and in seriously increasing one's susceptibility to respiratory diseases. The Commission's investigators reported that among pupils in a classroom ventilated to require the maintenance of a high temperature, the incidence of respiratory sicknesses was 70 per cent above that among children in two rooms of lesser temperature ventilated by window inlets and gravity exhausts.

The results reported by Dr. Winslow in this article are considered perhaps the most valuable finding of the Commission.

With Dr. Winslow on the Commission are: Dwight D. Kimball, ventilating engineer of R. D. Kimball & Company, New York; Dr. Frederic S. Lee, Professor of Physiology, and Dr. James Alexander Miller, Professor of Clinical Medicine, of the College of Physicians and Surgeons, New York; Earle B. Phelps, Professor of Chemistry, United States Hygiene Laboratory, Washington, D. C.; and Edward Lee Thorndike, Professor of Educational Psychology, Teachers College, Columbia University.

In addition to Mr. Sheldon, the Milbank Memorial Fund's directing board consists of Albert G. Milbank, Treasurer; John A. Kingsbury, Secretary; Elihu Root, John G. Milburn, Thomas Cochran, of J. P. Morgan & Company; George L. Nichols, and Dr. Charles M. Cauldwell.

Built in 1909, this typical Tarvia street is still in perfect condition after 16 years of service.

Tax-Payers Reelect Road Commissioner

Voters Repeat Performance of Last Election — Keep Commissioner Edwards in Office

By an overwhelming vote of confidence yesterday, J. E. Edwards was reelected to the office of Road Commissioner, a post which he has held continuously since 1909. The absence of all opposition testifies to the complete endorsement by the taxpayers of the Road Commissioner's program.

Old residents can recall when Commissioner Edwards, advocating a comprehensive policy of road construction, repair and maintenance, first took office in 1909. Sixteen years ago. Prior to his encumbency the streets of the community were in sorry shape. Yet with considerably less than a liberal appropriation, Mr. Edwards was able to accomplish wonders.

Main Street was his first objective. So far gone was the surface of this main thoroughfare, it was decided to completely [illegible] work was done in the summer

The road official's record is "out in the open"—

Tarvia Service *Chapter VII*

AS all public officials know, no official record is more completely out "in the open" than that of the road commissioner. If old roads are not well kept up, if new construction is not going forward, taxpayers soon begin to stir things up.

Quite natural that so many road commissioners lean toward a Tarvia program. For Tarvia enables them to point to sound economies effected — to savings in first cost and maintenance and savings on equipment.

In brief, the experience of hundreds of road officials has proved conclusively that for the money spent Tarvia gives more miles and the most years of satisfactory highway service.

Tarvia
For Road Construction Repair and Maintenance

The Barrett Company

New York	Chicago	Philadelphia	Boston
St. Louis	Cleveland	Cincinnati	Pittsburgh
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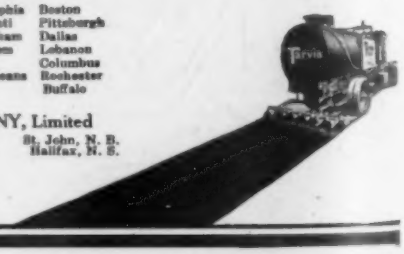

Declaration of Independence on the Boston Common

IT is the intention of the Mayor of Boston, Hon. James M. Curley, to have erected on Boston Common a bronze tablet with granite base and shaft bearing the complete Declaration of Independence together with the standard picture of the Congress engaged in making that document. The structure will be about 12 feet by 9 feet in size, placed prominently on the Tremont Street side of the Common where it may be easily seen and studied as an added spot of historic interest. Preliminary dedicatory exercises are a part of the municipal program for Independence Day, this Fourth of July.

A Plan for Motion Picture Study Clubs

AT the National Better Films Conference held recently under the auspices of the National Committee for Better Films, Professor Leroy E. Bowman, of the Department of Social Science, Columbia University, and Secretary of the National Community Center Association, presented a plan which had been evolved by the National Committee for Better Films out of the experience of groups throughout the country working for the education of the public with regard to motion pictures and for the improvement of local exhibitions. This plan, which met with enthusiastic endorsement, has now been published in pamphlet form.

The distinctive feature of this study club plan is its emphasis upon study, upon knowledge of the facts, and understanding of the motion picture as a basis for action. To facilitate the carrying out of this idea, the National Committee intends to supply motion picture study clubs with a series of papers for presentation at monthly meetings commencing September, 1925. These will cover such subjects as the history of motion pictures, the social problem they have raised, the psychology of censorship, the psychological reactions of audiences, the means of improvement likely to prove successful, the questions of taste and morals, the nature of the motion picture as a popular entertainment, as a visual educator, as a medium of artistic expression, as a thing of social meaning, as a form of expression in relation to other arts, etc.

Other services supplied by the National Committee to the secretary of the study club comprise the monthly and weekly selected lists of the National Committee, its annual catalog, "Film Progress," its monthly bulletin-magazine, "Exceptional Photoplays," and the Weekly Official Bulletin of the National Board of Review. In addition, every member of the study club will receive the monthly selected list (known as the Photoplay Guide), "Film Progress' and "Exceptional Photoplays." And all this is offered at terms within the means of any organization applying for membership.

Important activities which are fully described are: the preparation and publication of a weekly local Photoplay Guide to direct the public to the Better Films, the conduct of junior matinees, the arranging of special family performances, the holding of monthly meetings and special open meeting nights for the whole community, at which there may be an address by some authority on motion pictures, or the exhibition of some unusual artistic film, and cooperation with the library in the matter of book-films.

The motion picture study club as contemplated will be composed of representatives of all leading organizations. Membership is by charter, to be held by the club so long as it is active and conforms to the principles underlying the proposed work. The plan, together with form of application for membership, is available from the National Committee for Better Films, 70 Fifth Avenue, New York City.

Vacations for New-Yorkers

A VACATION Service Bureau for employees of New York City business concerns, the first of its kind in America, is announced by the Playground and Recreation Association of America, under whose auspices the Bureau was organized. The purpose of the Bureau is to simplify the problem of selecting the kind of resort the vacationist wants in territory most frequented by New York City residents. It is non-profit making.

Over six hundred places in the Adirondacks, the Catskills, and the Pocono Mountains, the Jersey shore, the Lake Hopatcong section of New Jersey, Ulster, Orange and Sullivan Counties, New York State, the eastern end of Long Island, the Delaware River Valley and the west side of the Hudson, south of Albany, were visited by the Bureau's representatives last summer and fall. Complete data were obtained on 550 of these places. Not only the personal observations of those making the study but the recommendations of townspeople, including postmasters, librarians, bankers, school heads, town officials, and secretaries of chambers of commerce were taken into consideration. Written information was also secured from former resort guests whose names were furnished as references.

The findings of the Bureau have been put together in a book called "Vacation Days: The Vacationist's Guide." This gives general data concerning resorts and answers the vacationists' major questions, such as transportation rates from New York City, routes, traveling time, distance by automobile, address, name of proprietor, season rates, capacity, clientele, location, facilities and amusements. The book contains a map showing all towns where resorts are listed and also zones indicating the lowest and the highest round-trip transportation costs. The guide has been placed with many business concerns, which are making it available to their employees in rest rooms, libraries, and in other places where it will be readily accessible. Employees obtain their information from the guide and make their own vacation arrangements directly with the resorts.

The survey of the Vacation Service Bureau is eventually to comprise the whole of New England, New York, New Jersey, and Eastern Pennsylvania, including mounain, seashore, and country resorts. The Bureau has an advisory committee, which is as follows: Chairman, Waldo Amos, of the American Telephone and Telegraph Company, A. T. Bell, director of Chalfonte-Haddon Hall, Atlantic City; A. S. Donaldson, assistant general manager of R. H. Macy and Company; C. R. Dooley, manager of the personnel and training of the Standard Oil Company; Frank S. Hackett, headmaster, Riverdale Country School; N. W. Pringle, Passenger Traffic Manager of the Lehigh

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More Than $70,000,000 Annual Charity Expenditure in New York City

THE first effort on record to analyze New York's annual charity expenditure of more than $70,000,000, to find out exactly where the money comes from, and for what purposes it is used, is reported in the June issue of *Better Times*, the welfare magazine. Edith Shatto Kings and Augusta H. Frear of the Charity Organization Society have collected financial data for 1923 from 7 public departments and 474 of the largest private charitable societies and, by analysis and comparison, have arrived at a fair estimate of the extent of the city's annual charity bill and the means by which it is met. The study takes account only of societies with major philanthropic purposes and does not include the charitable expenditures of churches, fraternal groups, or the great endowed foundations.

The study shows that in a typical year 37 per cent of the city's charity bill is paid with funds raised by taxation. In 1923, the year studied, the city expended $19,158,346 itself, through its own institutions for the care of the sick and unfortunate and for the promotion of public health and welfare, and, in addition, it appropriated $6,929,239 to private agencies for the care of public charges. The private philanthropic societies expended in all $50,892,027, including the appropriation from the city mentioned above.

If Disaster Comes, Let the Boy Scouts Help!

BOY SCOUTS in and about those sections of the Central West recently ravaged by tornado have won a place in scouting's book of honor, states a report of the boys' heroic relief work received from the national headquarters of the Boy Scouts of America. In this emergency, as in many similar instances in the past, the value of Scout preparedness to the community and to the state was demonstrated in a practical way. Offers of service came to the devastated towns from every adjacent Scout center and from troops many miles distant. In all, about 1,000 Scouts were mobilized to serve wherever needed.

In Murphysboro, Ill., one of the towns most cruelly hit by the cyclone, the Scouts served by excavating ruins, by transporting supplies, and by acting as orderlies, kitchen police, and general messengers. Their help was reported as invaluable. In West Frankfort, Ill., the local Scout Council office became a relief headquarters, with 500 Scouts mobilized for service. Many trying tasks, such as stretcher bearing, first-aid work, scrubbing in hospitals, searching for the missing, delivering supplies for undertakers, burning used bandages, etc., were manfully handled. One hundred boys were turned over to the Western Union to take charge of the mass of telegrams which poured in; others combed the city to secure Red Cross supplies, clothing, and food. By noon of the day following the storm, the Scouts had filled two large store buildings with food supplies, and under the supervision of the Salvation Army had begun to sort them and distribute them to the needy. Under Red Cross supervision, fifty Scouts scoured the devastated district of the city, compiling a list of the missing and checking it with the lists of those in the morgue and hospitals.

In Griffin, Ind., a troop from Mt. Vernon, over twenty miles distant, did valiant work. Patrols under the leadership of an assistant Scoutmaster immediately set to work to better sanitary conditions by burying the dead animals lying in the streets and fields. Other members salvaged valuables from the ruins and turned them over to the proper authorities.

A contingent of Scouts from Piedmont, Mo., were among the lads in khaki who won special recognition for relief work in Annapolis. During their stay of two days and nights in this city they guarded twenty-five Government tents, the Red Cross clothing car, and damaged stores. They also washed dishes, worked in the clothing car, assisted in cooking, flagged trains, and served as traffic police.

Nineteen of the injured townspeople of Gallatin became the special charges of their local Scout troop. A large unused residence was converted by the boys into a temporary hospital, and here the injured remained for over a week. The Scouts worked in cooperation with the Red Cross and served their patients daily from 7 A. M. until 9.30 P. M., operating in squads of four on three-hour shifts. On the Sunday following the disaster the entire troop went on duty to keep away from the quiet hospital the crowds of curious sightseers, and to help direct traffic along the congested highway.

By their prompt relief work throughout all sections of the stricken area, of which the few instances cited are typical, the Scouts showed that they were living up to their motto of "Be Prepared."

Chimneys and Flues in Building Codes

IN a paper presented at the recent Building Officials Conference in Madison, Wis., D. Knickerbacker Boyd, consulting architect, brought out several important aspects of the relation between building code requirements governing chimney construction and the health and safety of the community.

Mr. Boyd emphasized the necessity for requiring every flue to be fully lined with fire-clay flue lining which would furnish a smooth and fire-safe flue, causing a better draft. Attention was called to the fact that the leading cause of fire in eleven states last year was "defective chimneys and flues." This is a strictly preventable cause and represents an avoidable economic waste.

Advocating adequate-size flues, and especially requirements governing the minimum area of flues for various types of heating and cooking appliances, Dr. Boyd said:

"A flue which is too small will not only be costly and annoying but will create an additional fire hazard, because there is danger from attempts to force the furnace in cold weather, causing overheating of the smoke-pipe—and even the flue—and

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also from attempts to secure heat from other and perhaps unsafe means.

"A flue which is too small will be a liability to the community in other ways. It is impossible to get proper combustion without adequate draft, which means that when the flue is too small, the air of the city is constantly being contaminated with soot and poisonous gases which should have been consumed in the fire-box. Smoke in itself is costly, and detrimental to the health of the community, and should be eliminated wherever possible.

"The minimum inside effective area of all flues connected with heating apparatus has a definite bearing on the health of people, because it is impossible to adequately heat a house when the flue is too small. Every winter much sickness is caused by improperly heated dwellings. Especially in the poorer quarters, cold, damp houses, often due to the heating apparatus failing to function because of inadequate flues, are the cause of many cases of pneumonia and tuberculosis. These conditions could have been avoided with little or no extra expense when the house was built, by having the flues large enough to utilize the heating equipment to the best advantage and—what is very important to the poorer classes—obtain more heat without additional operating expense."

Another phase of the subject discussed by Mr. Boyd was the desirability of subjecting every flue to a smoke test. Complete copies of the paper may be obtained from Mr. Boyd at 112 South 16th Street, Philadelphia.

A Ten-Year Financial Program for Detroit

AFTER five months of intensive effort, a special Finance Committee, appointed by Mayor John W. Smith and charged with the task of laying out a ten-year financial program for Detroit, has rendered its report.

The first object of the committee was to ascertain what improvements were desired during the next ten years. When estimates for desired improvements were submitted by city departments, they reached the astounding total of $779,991,477. Even this great sum did not include any expenditures for the proposed super-highways, port development, enlargement of present city boundaries and contingencies which might conceivably increase the program to a billion dollars.

Had the committee approved the $779,991,477 expenditure, the city tax rate would have been $28.84 per thousand for the first year, plus approximately $5.00 per thousand for the state and county taxes, or a total tax rate of nearly $34.00 per thousand.

The committee was positive in its belief that such a tax rate would not be to the best interests of the city. But, realizing that certain improvements are absolutely essential—such as sanitation, water, health, and education—a capital outlay budget of $444,990,875, not including the ordinary maintenance charges, and covering a period of ten years, has been recommended. This budget would result in an average city tax of $20.65 per thousand during the next ten years. To finance this budget at a tax rate of $20.65, the assessed valuation of the city must be increased at least $225,000,000 each year, it being expected that this increase will come from new buildings, increases in valuation, and probable annexation of new territories.

The high lights of the committee's report are published in the June 1 issue of *The Detroiter*. In addition, a complete report has been printed and copies are now available at the Detroit Board of Commerce and at the Detroit Bureau of Governmental Research.

Fire Prevention Work Keeps Down Fire Loss

THE waste occasioned by fires in Dayton, Ohio, has been exceptionally low during the last four years. The losses, as reported in the April issue of the *Dayton Municipal Review*, were $154,871 in 1924, $263,283 in 1923, $172,388 in 1922 and $225,906 in 1921. The losses per capita during those years were $0.94, $1.65, $1.08, and $1.45 respectively.

Several reasons may be given for the good record attained by the local Fire Division. Among these are the timely discovery of fires, quick response, and good fire methods, but the most important factor is fire prevention and protection.

A summary of a day's work accomplished by three fire inspectors in a residential district is of interest. These inspectors made 24 new inspections and 34 reinspections, a total of 60 calls during the day. As the result of the reinspections, it was found that 24 chimneys had been repaired, 6 furnace smoke pipes replaced, 4 cellars cleaned, 7 gas violations eliminated, 1 electric violation removed, and 24 miscellaneous corrections made; a total of 59 conditions corrected that were liable to cause fire, nearly an average of 2 violations for each reinspection made—an indication that nearly every home contains hazards that are likely to cause fire.

Effect of Trees on Temperature

IN a discussion of the effect of trees on temperature, reported in a recent issue of the *New York Evening Post*, Wesley Bailey Leach, City Forester of New York, points out that if our streets and parks were well supplied with vigorous trees we should have much cooler summers and warmer winters. He gives as his chief reason for this theory the fact that the temperature of a tree never varies, in summer or in winter, from 54° F. "If we cross one of our avenues on a hot day," states Mr. Leach, "when the temperature is 100° F., and pass under the shade of a tree, we are refreshed by the cool air that meets us. What makes the change? Not the shade alone, but chiefly the fact that we are in the presence of a body that has a fixed temperature of 54° F., or 46° cooler than the street temperature." Likewise, on a cold winter day, in passing from the zero temperature of the street into a group of trees, the warmth experienced is due not only to the shelter afforded by the trees but to the warmth of the trees themselves.

In its function of transpiration, also, Mr. Leach points out, the tree contributes greatly to our comfort and health. The large quantities of water absorbed by the tree from the earth and emitted, as if by spraying, into the surrounding air through the medium of the leaves, considerably lowers the temperature in the vicinity. The amount of water thus thrown into the air varies according to the weather, increasing as the temperature rises, and diminishing as it falls.

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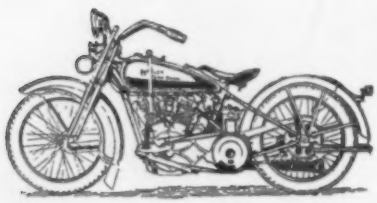

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Scope of Municipal Power to Safeguard the Public Health

PRIMARILY, control over the public health rests with the state, excepting so far as interstate or foreign commerce presents a case within the exclusive authority of the Federal Government. In the main, a city acts as a local administrator for the state. But the peculiar needs of different localities make it virtually necessary that the state delegate to municipalities a large measure of control in dealing with matters pertaining to the public health—matters which furnish one of the chief excuses for the existence of organized government. It is not necessary, however, that municipal authority to safeguard the public health in a given particular be conferred in express terms. As declared by the Illinois Supreme Court in the case of Gundling vs. Chicago, 52 Northeastern Reporter, 44:

"The regulation of the police power is hardly susceptible of exact definition, as the exigencies of each case are varying, and the cases are innumerable where the health of the inhabitants of the municipality may be in some degree endangered. When the city council considers some occupation or thing dangerous to the health of the community, and, in the exercise of its discretion, passes an ordinance to prevent such a danger, it is the policy of the law to favor such legislation as being humane and essential to the preservation and protection of the community. *Municipalities are allowed a greater degree of liberty of legislation in this direction than any other.* The necessity for action is often more urgent, and the consequences of neglect are more detrimental to the public good in this than in any other form of local evil."

But health regulations are no exception to the rule that municipal ordinances must be reasonable and avoid unjust discriminations. So, the Alabama Supreme Court has decided (Board of Commissioners of Mobile vs. Orr, 61 Southern Reporter, 920) that an ordinance requiring that stables in which more than one animal is kept be connected with the city's sewer and water systems, is void. The Court said:

"A reasonable line of distinction may be drawn between the case of keepers of single animals and that of keepers of many, as, for example, public livery stables and dairies. . . . But if the municipality chooses to tolerate those inevitable disadvantages which attend the collection of animals in groups, it occurs to us that there are no sufficient reasons why similar feasible sanitary conditions should not be required in the case of keepers of single animals as well as in that of the keepers of two or more. If the public health and comfort require that where two or more animals are kept together they shall stand upon concrete floors, their droppings kept in water-tight receptacles, their stalls or pens connected with water-mains, drained into sanitary sewers, and thoroughly cleaned at least once each day, all to the good end, no doubt, of preventing the diffusion of odors and the breeding of the pestilent fly, it would seem that an impartial imposition of the burdens of police regulation ought to exact similar precautions of the keepers of single animals far more numerous in the aggregate."

Prominent among the matters which may be regulated by a city in the interest of the public health is the production and sale of milk; the disposal of filth, sewage, etc.; the burial of the dead; and the sale and serving of food, etc.

Numerous decisions attest the right of the legislature of a state to give a city jurisdiction beyond the city limits, so far as reasonably appropriate to enable the municipality to protect the public health of its inhabitants. Thus, cities are often given power to control the location of cemeteries within certain distances from their corporate limits.

An ordinance providing for removal of garbage from a city under exclusive contract with the city and forbidding others to engage in the occupation of garbage removal, is a valid exercise of the municipal police power, according to the holding of the Missouri Supreme Court in the case of Valley Spring Hog Ranch Company vs. Plagmann, 220 Southwestern Reporter, 1.

Although a city may *regulate* the location of hospitals for the treatment of contagious or infectious diseases, it may not *prohibit* establishment of such an institution in the city, held

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the California Supreme Court in the case of San Diego Tuberculosis Association vs. City of East San Diego, 200 Pacific Reporter, 393. The Court said:

"Such prohibition is very different from regulation, and can be justified only on the ground that such a hospital, no matter how well conducted, is a menace to the public peace, morals, health, or comfort. That a well-conducted, modern hospital, even one for the treatment of contagious and infectious diseases, is not such a menace, but, on the contrary, one of the most beneficent of institutions, needs no argument. There is not the slightest danger of the spread of disease from it, and this is the only possible ground on which objection could be made to it."

In proper cases, a city, under charter or statutory power, may condemn buildings which menace the public health. But, as noted by the Texas Court of Civil Appeals in the case of City of Forney vs. Mounger, 210 Southwestern Reporter, 240, where a nuisance caused by the accumulation of filth can be abated by compelling removal of the filth, there is no power to compel abatement of the building in which it exists.

Although a city's legislative powers cannot be validly delegated to administrative officers, they may be authorized to use reasonable discretion in determining whether or not existing conditions adequately safeguard the public health. For example, the Ohio Supreme Court, in sustaining the validity of an ordinance regulating laundries, held that it was not unconstitutional as conferring legislative or judicial powers on an administrative officer who was empowered to ascertain whether sanitary and drainage arrangements were sufficient to protect the public health, and whether "adequate ventilation" and "adequate plumbing and drainage facilities" were provided on the premises. (Yee Bow vs. City of Cleveland, 124 Northeastern Reporter, 132.)

It is a reasonable exercise of a city's police power to require abutting landowners to connect their buildings with public sewers, although they may be served already by private sewers. (New Jersey Supreme Court, Fenton vs. Atlantic City, 103 Atlantic Reporter, 695.)

In passing, it is interesting to contrast health conditions in modern cities with those English cities pictured in Mrs. Green's "Town Life in the Fifteenth Century." We are told that householders winnowed their grain by throwing it from their windows into the streets, that the streets were choked with the refuse of stables, or turned into swamps through discharge of waste waters from dyers' establishments.

But the forerunner of health regulations appeared in 1388, when a statute enacted that town officers must clean their towns of all that could corrupt and infect the air and bring disease. Ninety-nine years later, Londoners secured a law forbidding butchers to slaughter within the walls of the city. The law was so extended as to apply to all walled cities of England, excepting Berwick and Carlisle.

Items of Municipal Law

City Held Not Liable for Negligent Enforcement of Building Code

The city of New York is not responsible for any possible negligent enforcement of the provisions of the Building Code, holds the Appellate Division of the New York Supreme Court in the case of Metzroth vs. City of New York, 208 New York Supplement, 744. The opinion follows a previous declaration by the Court:

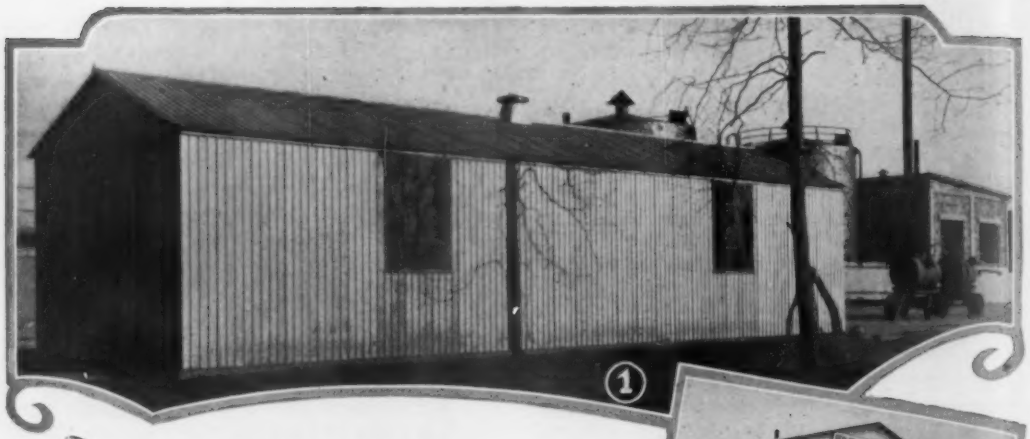
"The building department is not an administrative department of the city. It is a bureau created by statute to perform a public service, in which the city itself has no private interest and from which it derives no special benefit or advantage in its corporate capacity, and for any neglect, either of omission or commission on the part of the officers connected with such bureau, the city is not liable."

Support of College Constitutes "City Purpose" for Which Taxes May Be Levied

Holding that support of the College of the City of New York is a "city purpose" for which taxes constitutionally may be levied, the Supreme Court for New York County said in the case of College of the City of New York vs. Hylan, 199 New York Supplement, 634:

"There are many things done to-day by cities, and by governmental agencies generally, for the the advancement of the welfare of the people, that would not have been permitted only a few years ago. If, 50 years ago or less, a legislator had proposed a workman's compensation bill, he would have been laughed at; and it will not do to say, when a new project is launched that seems to be natural and proper and calculated to promote happiness and general good, that it cannot be permitted merely because no such thing was ever before attempted by a governmental agency.

"The phrase 'city purpose,' as employed in the Constitution must, I think, be given a construction that fits not only the time, but the place. It is possible that, if a small and poor village were to seek to establish a college, it could be said that the enterprise would not serve a 'village purpose.' New York, if not the richest and the most magnificent of the cities of the world, as many believe it to be, is at least a very great and a very rich city, and many things are proper for it to do that might not be proper in the case



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of a small and poor community. I think there is little room for doubt that it is proper and eminently desirable for this city to maintain free institutions of higher learning like the College of the City of New York. If, therefore, the constitutional question before me had arisen with respect to a wholly new attempt to establish a free college within the city, I would be prepared to hold that such an institution was calculated to serve a city purpose."

City Held Liable for Negligent Operation of Steam Roller

A city was not immune from liability for injury negligently caused by the frightening of a team of horses through the sudden blowing-off of steam by a steam roller in a street, on the theory that the city was engaged in discharging governmental functions, held the New Jersey Court of Errors and Appeals in the case of Olesiewicz vs. City of Camden, 126 Atlantic Reporter, 317. The opinion turned somewhat on the fact that the city operated the roller for profit under contract with individuals and private corporations, as well as using it in street improvement work. But the Court added:

"The fact is undisputed that the appellant [the city] embarked upon a private enterprise, presumably for profit, or, if not, at least for the sake of economy, in having the work done cheaper and better than by letting it out on contract to a successful lowest competitive bidder, as required by the statute. It is not essential that the municipality carried on the private enterprise for profit in order to hold it amenable for the acts of its servants engaged to do the work; it is sufficient if it derives some special benefit or advantage."

Statute Requiring Cities to Levy Tax to Pay Hydrant Rentals Upheld

The Nebraska statute requiring cities to levy taxes to pay hydrant rentals due from them to water-supply corporations is not violative of a local constitutional prohibition against the imposition of taxes upon municipal corporations, or the inhabitants or property thereof, for corporate purposes, declared the Supreme Court of the state in the recent case of State vs. City of Omaha, 200 Northwestern Reporter, 871. The Court said:

"The primary purpose of such hydrants is for fire protection, and secondarily, or perhaps of equal importance, for the flushing of sewers and cleaning of streets. All these operations are carried on for the public welfare and safety, and are for the protection of the health and safety of the public, and find their authority in the general police power of the state which has been in part delegated to the municipality."

The Municipal Bond Market

By Sanders Shanks, Jr.

Editor, *The Bond Buyer*

FOR the past few years, the month of June has been the biggest month of the year. This year, it is expected, will not be an exception, although the month's bond issues will hardly equal the June total of last year.

The municipal bond market has improved steadily since the first of the year. In fact, there has been a steady, though gradual, improvement since January, 1924, as is shown by *The Bond Buyer's* average market value (expressed in net interest cost) of bonds of the twenty largest cities in the United States. The January, 1924, figure was 4.37 per cent; and June, 1924, was 4.26 per cent. The January, 1925, average was 4.16 per cent; and the June, 1925, average 3.99 per cent. This last figure is almost in line with the high figure of 1917.

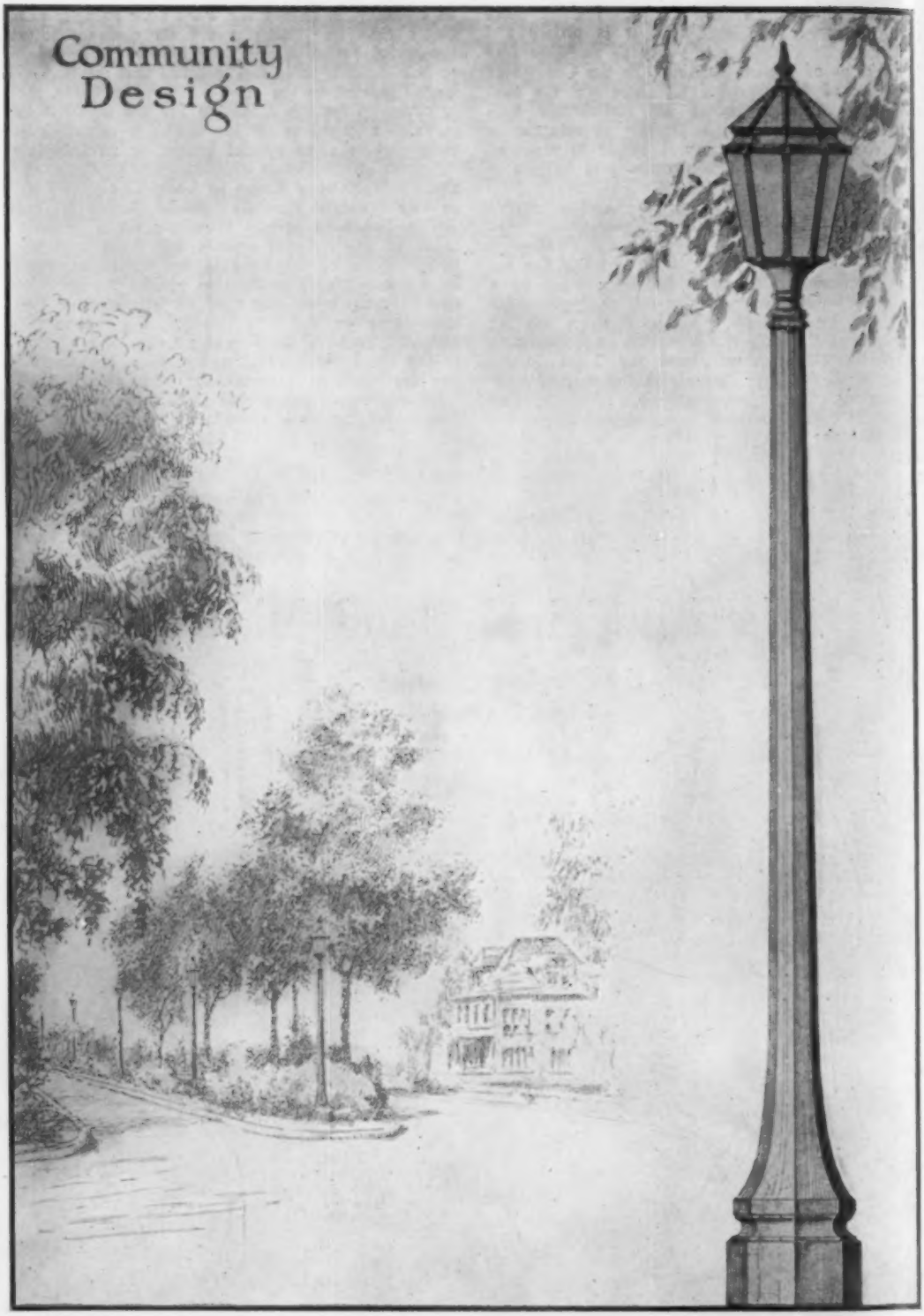
While there was a large supply of bonds in the hands of dealers during the early part of June, an active investment demand during the latter part of June and the early weeks of July should easily absorb the present floating supply of $100,000,000 to $150,000,000 of bonds.

Municipalities throughout the country are taking advantage of this market by "calling" optional bonds which were issued at high interest rates a few years ago. These refunding issues are being marketed bearing coupon rates from 1 to 2 per cent lower than the original rates.

During the early part of June the state of North Carolina negotiated the sale of $9,000,000 one-to ten-year serial 4¼ per cent bonds and $10,000,000 3½ per cent, six months' notes. As the sale was not publicly announced, the price paid for the bonds is not known. On June 23 the state of New Jersey received bids for $10,000,000 4½ per cent highway bonds. Investors are paying substantial premiums for outstanding 4¼ per cent bonds of New Jersey.

The following is a list of some of the most important issues floated during the month of June:

Amount	Borrower	Maturity	Rate (%)	Yield (%)
$1,700,000	Albany, N. Y.....	1926-45	4	3.87
1,800,000	Maryland	1928-40	4½	3.88
570,000	Troy, N. Y.....	1926-65	4¼	3.89
7,500,000	Missouri	1933-39	4½	4.02
1,122,500	Milwaukee, Wis....	1926-45	4, 4½ & 5	4.05
585,700	Elizabeth, N. J.....	1931	4¼	4.06
625,000	Irondequoit, N. Y..	1930-54	4½	4.15
2,000,000	Dallas, Tex.	1926-65	4¼	4.16
1,000,000	Baltimore Co., Md..	1936-65	4½	4.16
685,000	Gloucester Co., N. J.	1926-45	4¼	4.18
800,000	Colorado Springs, Colo.	1930-39	4½	4.22
1,000,000	Greensboro, N. C...	1927-36	4½	4.26
750,000	Memphis, Tenn., School District...	1930-64	4½	4.30
550,000	Shelby Co., Tenn...	1935-54	4¾	4.32
990,000	New Orleans, La...	1927-36	4½	4.33
3,000,000	Los Angeles Co., Calif., Los Angeles City and High School Districts..	1925-64	5	4.38
2,500,000	Duval Co., Fla., Spec. Tax Sch. Dist. No. 1.....	1928-55	5	4.38
500,000	Greensboro, N. C...	1928-65	4½	4.40
3,800,000	Dade Co., Fla., Spec. Tax Sch. Dist. No. 2	1928-52	5	4.57
600,000	Harrison Co., Miss.	1927-34	4¾	4.67
783,000	Bradenton, Fla. ...	1935-55	5½	4.81
939,000	Miami Beach, Fla..	1926-45	5¼	4.86
500,000	Titusville, Fla.	1955	6	5.50



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Zoning Notes

Prepared by Frank B. Williams
Author of "The Law of City Planning and Zoning"
From data collected by the Zoning Committee of New York (233 Broadway)
Mr. Williams may be addressed in care of THE AMERICAN CITY, 443 Fourth Avenue, New York

Recent Zoning Ordinances and Enabling Acts

CONN.—State-wide enabling act, applying to cities, towns and boroughs, passed June, 1925.

—Special act, applying to town of Greenwich, keeping former special act in force.

HARTFORD, CONN.—Ordinance, May, 1925.

NEW BEDFORD, MASS.—Ordinance, April 23, 1925.

Recent Zoning Decisions

MAINE.—*Opinion of Justices*, 128 *Atl.* 181. The Justices of the Supreme Court have given the following opinion with regard to the validity, under the Maine constitution, of a bill modeled upon the standard enabling act prepared by the Department of Commerce at Washington:

The Legislature may delegate to the legislative bodies of cities authority to exercise the police power. The term "incorporated villages," used in the bill, is not applicable to Maine. The regulation of the height of buildings, their construction and the location of some kinds of businesses, not necessarily confined to those which are disorderly, offensive, or unsanitary, is constitutional. The regulation of the density of population, the percentage of lot that may be occupied, and the size of yards, courts, and other open spaces by the establishment of building lines under the police power, without compensation, is not justified. As to boards of adjustment and their authority to make special exceptions, no opinion can be expressed, until the ordinances, based upon them, are submitted.

NEW JERSEY.—*Union County Development Co. v. Kaltenbach, Building Inspector of City of Elizabeth* (*Supreme Court*), 128 *Atl.* 396. Mandamus to compel issuance of permit for erection of apartment in a single-family zone. The relator had appealed from the adverse decision of the Building Inspector to the Board of Zoning Adjustment. The respondent contends that certiorari and not mandamus is the proper remedy. The Court holds, however, that "certiorari will accomplish nothing * * *. There is nothing to be reviewed." The Court, on the authority of the Nutley case, granted the peremptory writ. In accord, State ex rel., Becker and Son, Inc., v. Dowling, Inspector of Buildings, and Board of Adjustment of City of Orange (Supreme Court), 128 Atl. 395; Falco and Corsello v. Kaltenbach, Inspector of Buildings of City of Elizabeth (Supreme Court), 128 Atl. 394; Builders Realty Co. v. Bigelow, Building Inspector and Board of Adjustment of City of Newark (Supreme Court), N. J. Adv. Rep. Vol. III, No. 22, p. 540, citing Plymouth Co. v. Bigelow, 2 N. J. Misc. R. 711; Shapiro v. Brennan, Director of Public Safety, and Board of Adjustment of City of Newark, N. J., Adv. Rep. Vol. III, No. 22, p. 543. See also Melrose Realty Co. v. Franke, N. J. Adv. Rep. Vol III, No. 2, p. 43.

—*Ingersoll v. Village of South Orange* (*Supreme Court*), 128 Atl. 393. In this case, similar in other respects, to the Nutley case, except that it relates to an application to build an apartment house in a one-family district, evidence was introduced that the village had not sufficient fire facilities adequately to take care of apartment houses in case of fire. *Held*, that the Nutley case should be followed. It is the duty of the municipality to provide for adequate fire protection. In accord, Michel v. Village of South Orange, N. J., Adv. Rep. Vol. III, No. 10, p. 243; Prince v. Board of Adjustment of Town of Montclair, N. J., Adv. Rep. Vol. III, No. 22, p. 547.

—*State ex rel. Losick v. Binda, Building Inspector of Township of Weehawken, et al.* (*Supreme Court*), 128 *Atl.* 619. The proposed apartment house violated the provision of the zoning ordinance. There was no appeal to the Zoning Board of Appeals, whose power was only to recommend appropriate action to the Township Committee, and that committee had approved of the action. *Held*, that such an appeal would have been futile. Mandamus granted.

—*State ex rel. Nelson Building Co. v. Binda, Inspector of Buildings of Township of Weehawken, et al.*, 128 *Atl.* 618. The regulations as to the number of families that may occupy a given building per acre of land covered (in the ordinance in question) "are such as arbitrarily limit certain areas to one- and two-family residences only * * *. We can find no reasonable ground for such restriction."

—*Lutz v. Kaltenbach, Inspector of Buildings of City of Elizabeth* (*Supreme Court*), 128 *Atl.* 421. Under P. L. 1924, p. 324, applicable to all the municipalities of the state, which provides for boards of adjustment, the appeal must be taken before resort to mandamus.

—*State ex rel. Max v. Saul, Building Inspector of City of Jersey City, N. J., Adv. Rep. Vol. III, No. 10, p. 265.* This case, summarized in the May *Notes*, is given here for the purpose of giving the reference to the report.

The Newark Evening News of June 10 states that the Supreme Court of New Jersey has granted permits to Frank L. Reimer for the erection of ten single garages contrary to a city ordinance. The ordinance provided that no garage should be erected within 150 feet of a dwelling. Describing the enactment as a subterfuge for a zoning ordinance, the Court is reported to have said that there could be no more danger in erecting a garage within 150 feet of a house than there would be in locating it within the same distance of a school, church, library, or other premises.

NEW YORK.—*Davis v. Philbert, Supreme Court, Special Term*, reported in *New York Law Journal*, April 16, 1925, p. 222. The zoning resolu-

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from
Electrical World
April 4, 1925

On August 1st, 1924, the city of Chicago began supplementing their electric lamps served from aerial circuits and gas and gasoline lighting units in the residential sections with modern electric lighting units installed on concrete standards. On March 1st of this year, approximately 6500 of the new units covering an area of 11 square miles of city territory and 220 miles of street, had been installed and were in operation. These lighting units have proved so satisfactory that the city of Chicago has ordered 6500 more.

John T. Miller, Commissioner of Gas and Electricity under whose supervision the work was undertaken, and is being carried on, has received many letters from citizens who say that they feel the security of lives and property has been greatly promoted.

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tions do not constitute an incumbrance.

—*In re Collins, Supreme Court,* reported in *New York Law Journal,* May 26, p. 798. A non-conforming business existing at the time of the enactment of the zoning regulation may be continued, and under certain conditions the property used may be enlarged for the same business; but there cannot be the substitution of another prohibited business.

—*Matter of Fontana, Supreme Court,* reported in *New York Law Journal,* May 19, 1925, p. 700. There is no estoppel to the revocation of a building permit obtained by fraud.

—*Matter of McGarry v. Walsh, Supreme Court, Appellate Division, May 22,* 1925. Petition to erect a public garage in a business district. The application, denied by the Superintendent of Buildings of New York City, was appealed to the Board of Appeals, solely upon the basis of Article 5, Section 20 (now section 21) of the zoning resolution, giving the Board the right to vary the resolution on the ground of practical difficulties or unnecessary hardships. The resolution also allows the Board [Section 7 (e)] to permit a public garage in a business district if a public garage had existed there prior to July 25, 1916, or (g) if the owners of 80 per cent of the frontage file consents. The appeal was not taken on the basis of Section 7 (e) or (g), but solely under Section 20 (now 21). No consents were filed. On February 29, 1924, the appeal was unanimously denied. On September 3, 1924, without producing any new evidence the owner under said Section 20 (now 21) of the zoning resolution applied to the Board to reopen the proceedings, and shortly thereafter this was done and the Board reversed its previous decision. The appeal to this Court is from that reversal. *Held,* that the Board was acting in a quasi-judicial capacity and had no power to reopen its decision.

—*Matter of Wertheimer v. Schwab,* 124 *Misc.* 822. Mandamus for permit to erect a building for a moving picture theater. The Council had passed an ordinance requiring applicant to get the consent of a church opposite. *Held,* that the ordinance was invalid; nor could the city control the location of the building under a so-called zoning ordinance which attempts to set up residential districts without fixed areas having definite boundaries.

—*People ex rel. Dinerman v. Walsh, Supreme Court, reported in New York Law Journal,* April 27, 1925, p. 377. The rule that, there being no arbitrary discrimination in the area involved, the Court should not act in an administrative capacity and substitute its discretion for that of the Board of Appeals, is especially valid when that which is sought involves a non-conforming use or an extension of an existing non-conforming use in derogation of the new general uses permitted in the zone.

—*People ex rel. Boyd v. Walsh, Supreme Court,* reported in *New York Law Journal,* April 29, 1925, p. 403. The first paragraph of Section 20 (now Section 21) of the zoning resolution of New York City gives the Board of Appeals power to vary the resolution where there are practical difficulties or unnecessary hardships in carrying out its strict letter. Paragraph 2 of this section provides that no permit for a garage for more than five cars shall be granted in a block where there is an entrance to, or an exit from, a public school. *Held,* that the Board of Appeals has power to vary paragraph 2 in cases of practical difficulty or unnecessary hardship.

—A recent case in the Municipal Court of New York City shows that the judges intend to enforce the residential provisions of the zoning resolution on Murray Hill and throughout the city. In this unique residential district in the heart of New York City, H. V. Bracegirdle as proprietor and Harris Bernstein as owner of the building were maintaining a cafeteria contrary to the resolution. John P. Fox, Executive Secretary of the Murray Hill Association, and Frank Dunn, Assistant Corporation Counsel of the City, prosecuted the case. The judge fined the proprietor and the owner of the building each $250.

—*People ex rel. Rosevale Realty Co., Inc., v. Kleinert, Superintendent of Buildings of Brooklyn, New York, et al., Supreme Court of the United States.* This is an appeal from the Supreme Court of New York involving the area restrictions of the New York City zoning resolution. The daily papers report that the United States Supreme Court has decided that no constitutional question is presented upon which it can properly pass.

—*The New York Times* of June 10 reports the filing of a decision in the Superior Court denying the application of 465 Lexington Avenue, Inc., for mandamus to compel the Building Inspector to issue a permit for a seven-story, thirty-five family apartment in the Chester Hill district of Mount Vernon; quoting from the opinion of the Judge the following:

"I am satisfied that the zoning regulations in question as to setbacks and rear yards are a valid exercise of police power, and are necessary to carry on the plans under which this residential district was laid out and developed and for the preservation of the property rights of those who have complied therewith in the development of their properties. To hold otherwise would simply destroy all the regulations established in the zoning laws and permit the overcrowding of the population, and burden the city with the enormous expense to meet the conditions created by the building of such houses in the district."

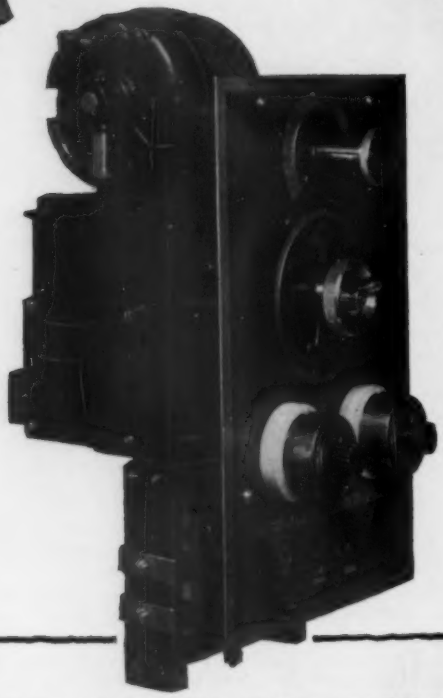
From the New Jersey Cases Cited This Month It Would Appear:

1. That it is only use zoning, the constitutionality of which has, in effect, been questioned in New Jersey.

2. That use provisions excluding industry from given districts are valid.

3. That the lower courts have rendered conflicting decisions as to whether under the enabling act of 1924 unsuccessful applicants for building permits for business structures in residential districts and for multi-family houses in restricted residential districts will be compelled to apply to boards of adjustment to remedy hardship or injustice and go up on certiorari, or can resort at once to mandamus.

4. That therefore it remains for the Court of Errors and Appeals (the highest state court in New Jersey) to decide this point, which will probably settle the question whether effective use zoning is possible in New Jersey without the passage of a state constitutional amendment.



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than five cars shall be granted in a block where there is an entrance to, or an exit from, a public school. *Held*, that the Board of Appeals has

sible in New Jersey without the passage of a state constitutional amendment.

From the International Union of Cities

Items translated from "Tablettes Documentaires Municipales" by Stephen Child, 410 Maryland Building, Washington, D. C., to whom requests for further information regarding this source of civic documentation should be addressed

The Department of the Seine Planning Great Open Spaces. 71.6 (44.361)

The future garden city of La Courneuve-le-Bourget, which is something over three miles northeast of Paris and includes the area between La Courneuve, le Bourget, Dugny, and Stains, is the first effort of the Department of the Seine in planning for a garden city analogous to but on a larger scale than that of the Compagnie du Nord. Under the auspices of the Society of City Planning Studies and the special direction of M. Auburtin, the well-known city planner, and Mr. Dautry, Chief Engineer of the Northern Railroad, the principal organizer of garden cities for this railroad system, a competition has been held for plans for this project. From the memoranda attached to the winning plans, which give the directions for the main lines of the program, we are able to appreciate the importance and extent of this vast project. It is to include an area of some 1,000 acres in a single holding, but located in several communes, and capable of accommodating a population of 80,000 people. There are cultivated lands as well as hilly, broken areas and ravines, the altitude varying from 100 to 165 feet. This area is already traversed by several highways, tramway routes, and railroads. The plans provide for the separation of the lands into three zones—an industrial zone, a zone of grouped houses, which will include commercial structures and be the most densely populated, and, finally, a zone of detached houses, each with a small garden of about 2,500 to 3,000 square feet. The project is to include a well-developed system of highways, with broad avenues, main and minor roads, all paved with cement and the installation of complete water-supply and sewerage systems, as well as gas and electric light equipment. There will be a special electric railway station for the new town, as well as a post office, a community house with large assembly hall, library, shower-baths, rooms for the care of children, schools with open-air facilities, and so on. Steps are being taken to execute this remarkable project as rapidly as possible. The work is to be started during 1925.

Garden Cities in France. 71.313 (44)

The "Chemins de Fer du Nord" (The Northern Railway) of France has built for its employees, since the Armistice, about 12,000 houses. These are grouped in 35 garden cities, which are provided with all modern public utilities, with children's "creches," having facilities for consultations in regard to proper nourishment, and so on. In general, the houses have four rooms, a large common-room (serving as a kitchen), and three bedchambers with an average area of 12 square meters, or about 120 square feet. Gardens or rear yards vary in size from 4,500 to 5,000 square feet. In some instances the large common-room is replaced by a smaller one with a separate kitchen and a bathroom. About 10 per cent of the houses have five rooms to accommodate larger families. In several of the groups there is a large "home" for unmarried men. In some cases, too, there is a central heating plant providing hot water and heat to the lodgings and equipped with hot-water baths. Cooperative stores and community organizations are encouraged.

Satellite Cities in Germany. 71.327.3

While the idea of satellite cities is quite generally accepted in Germany, practical methods of realizing these are now being more carefully worked out. One of the principal difficulties to be surmounted is due to the requirements of German law regulating individual ownership of land. In order to plan areas with a view to colonization, it would be necessary first of all to suppress all legal obstacles to individual rights. In the opinion of many, standardization of lodgings is very important; by building houses in large numbers, it is possible to realize great economies. It is important, too, to secure some industry that, with its accompanying professional and other employees, would form a natural nucleus for the satellite city.

A New System of House Building in England. 69 (42)

A Mr. Savory of Bristol, England, has invented a system of construction that does away with masonry and platforms or stagings. The house is composed of a metallic framework protected by a special rust-proof paint. Cement slabs, varying in size from 10 x 20 inches to 30 x 40 inches, are attached to this framework by means of wooden plugs fitted into cavities or holes in the slabs. The interior walls and floors are covered with the same slabs.

Inexpensive Housing in France. 33.332 (44)

The Orleans Railroad gives its financial cooperation, in the form of advances or subscriptions, to private building organizations that agree to give priority in the allotment of lodgings they construct, to the railroad company's agents or employees. The company has allowed the Fraternal Association of the agents of the railroad an annual subvention of 2 per cent on the capital employed in the construction of lodgings to be rented to its personnel. Ninety houses have been built in this way at Bretigny-sur-Orge. Furthermore, the company bought 150 lodgings, and has built 112 houses and now proposes to erect a workmen's city near Tours.

Rural Housing in France. 33.332 (44)

Important reforms are proposed in the matter of rural housing in France. The changes deemed necessary include: first, provision for the better lodging of agricultural laborers, trial regulations for which have already been made, also reforms in financial methods, recourse to an agricultural loan considered desirable; second, rural lodgings or housing in general, with government aid, (a) as to legislation in regard to inexpensive housing (habitations à bon marché), building loan societies, and the setting up of limited-capital or cooperative rural building organizations, (b) agricultural loans, (c) public offices for (habitations à bon marché) inexpensive housing.

Inexpensive Housing in Italy. 33.332 (45)

Italian legislation as to inexpensive housing has been successively codified in laws passed in 1908 and 1919. The principal provisions of these laws are: loans at reduced rates by several kinds of organizations (savings banks, people's banks, cooperative loan societies, charitable loan societies, public benefit associations, national life insurance societies, institutes for land loans, the National Loan Institute, and its autonomous section established for the purpose of making loans on inexpensive houses); participation by the State Government; regulations in regard to buildings, sales, transfers, expropriation and so on.

Heating Houses in Germany. 66.297 (43)

The hygienic and economic necessity of better regulating the temperature of houses, both summer and winter, is being emphasized in Germany. It is believed this may be brought about through a greater degree of collaboration on the part of the architect and the engineer.

Cork and Its Utilization in France. 69.1

Cork, mixed dry with mineral tar (coal-tar-pitch), has been found to be the best protector against the transmission of either heat or cold in floors, and a remedy for the inconvenience of iron or reinforced concrete construction.

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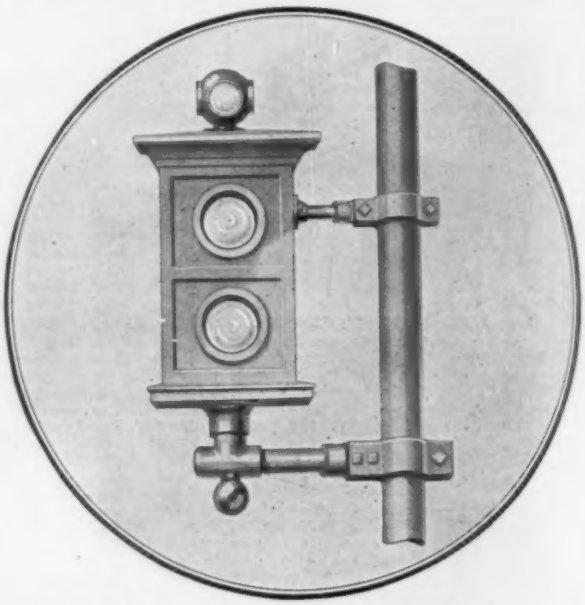

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Street **Traffic Control.**—By Miller McClintock, Ph.D., Assistant Professor of Municipal Government, University of California, Southern Branch; Consultant to the Los Angeles Traffic Commission. First edition. 1925. McGraw-Hill Book Company, Inc., New York. XI + 233 pp. Illustrated. $3.00.

An analysis of a problem that is affecting the safety and welfare of the entire nation and that cannot be solved through observation alone. This book shows how to make the necessary surveys and to interpret their results. It gets at the fundamental causes of congestion, and calls in city replanning to relieve the situation, at the same time suggesting minor and local changes to increase the street capacity. The regulation of moving and standing vehicles and of pedestrians and drivers is studied, and the legal and police side of the matter is dealt with in several chapters. This is a clear and practical exposition, based on expert evidence.

Specialized Courts Dealing with Sex Delinquency.—By George E. Worthington, Acting Director, Department of Legal Measures, American Social Hygiene Association; and Ruth Topping, Field Secretary, Bureau of Social Hygiene. Published by Frederick H. Hitchcock, New York. 1925. XIII+460 pp. $3.00

A study of the procedure in Chicago, Boston, Philadelphia, and New York, the result of an investigation made by the Bureau of Social Hygiene. The material shows the conditions, organizations, and methods of the four courts, comparing them, and gives the authors' recommendations for establishing and standardizing such courts in other cities.

Publicity. Some of the Things It Is and Is Not.—By Ivy L. Lee. Industries Publishing Company, New York. 1925. 64 pp. $1.00.

Addresses delivered before the American Association of Teachers of Journalism, Chicago, the Advertising Club of New York, and the Annual Convention of the American Electric Railway Association, including also questions and answers relating to principles and methods. The subjects are: Publicity and Propaganda; Publicity as Applied to Public Service Corporations. "A man who goes into a policy of publicity must believe absolutely that he is right and that he can justify his policy upon the theory that 'truth loves open dealing.' "

Appraising Your City.—A Scientific Method of Comparing the Advantages of Different Communities.—By William L. Bailey, Professor of Sociology, Northwestern University, Evanston, Ill. 3 quarto pp. in National Real Estate Journal, May 18, 1925. Showing how to measure the livelihood, economic and business conditions, the health and vital conditions, the basic social conditions, the civic life, the cultural and educational life, and the degree of Americanization in any community. (Apply to the National Real Estate Journal, 139 North Clark Street, Chicago, Ill.)

Simplified Procedure in Municipal Courts.—By Rasmus S. Saby, Professor of Political Economy in Gettysburg College. Reprinted from the American Political Science Review, November, 1924, in the Journal of the American Judicature Society, April, 1925. 7 pp. Showing the great need for dealing intelligently with the prevention, detection and treatment of crime in cities, and explaining what progress has been made in various states and cities in eliminating technicalities and increasing efficiency. (Apply to the Journal of the American Judicature Society, 31 West Lake Street, Chicago, Ill.)

Water-Supply for Jacksonville, Fla.—A Report on the Black Creek Municipal Water-Supply Project for Jacksonville, submitted to Frank H. Owen, Commissioner of Public Utilities, by C. V. Imeson, of the City Water Department, Engineer in Charge, and The Buckman Corporation, Consulting Engineers. Board covers, 172 pp. Views, charts, drawings, tables. A very full treatment of the needs of the city and how the source of water-supply selected, in Duval and Clay Counties, can be developed to meet these needs. (Apply to The Buckman Corporation, 708 Graham Building, Jacksonville, Fla.)

Life Saving.—Special number (June 1, 1925) of *The Red Cross Courier*, official publication of the American National Red Cross. This issue (32 pp.) contains a group of special articles on water safety, the value of swimming, and the sanitation of swimming pools. Yearly subscription, $1. (Apply to the magazine, 17th and D Streets, N. W., Washington D. C.)

The Empire Municipal Directory and Year Book for 1925-26.—Published by Municipal Engineering and the Sanitary Record (The Sanitary Publishing Co., Ltd.), 8, Breams Buildings, Chancery Lane, London, E. C. 4, England. 337 pp., besides diary pp. for year beginning April, 1925. 10s. 6d.

This valuable work is in its forty-third year of publication. It contains complete and authoritative lists of all the municipal corporations, county, urban, and rural district councils, with their populations, municipal undertakings, the names of their administrative officials, etc., in Great Britain, the colonies and overseas dominions. It is also an encyclopedia in its field, containing special articles on the past year's progress and the present practice in the various departments of municipal engineering and public health work.

Automobile Green Book.—Vols. 1 and 2, 1925. Scarborough Motor Guide Company, Indianapolis, Ind., and Boston, Mass. 856 and 1028 pp. Maps, $3.00 each.

Volume 1 is the official guide book of the Automobile Legal Association, Park Square Building, Boston, and covers the New England States and Canada and trunk lines west and south; Volume 2 is the official touring guide of the New York State Automobile Association and covers New York, New Jersey, Pennsylvania, Delaware, District of Columbia, Central Canada, and Florida, with trunk lines to New England and the West. Full information for motorists over these routes.

Child Marriages.—By Mary E. Richmond and Fred S. Hall. Russell Sage Foundation, New York. 1925. 159 pp. $1.50.

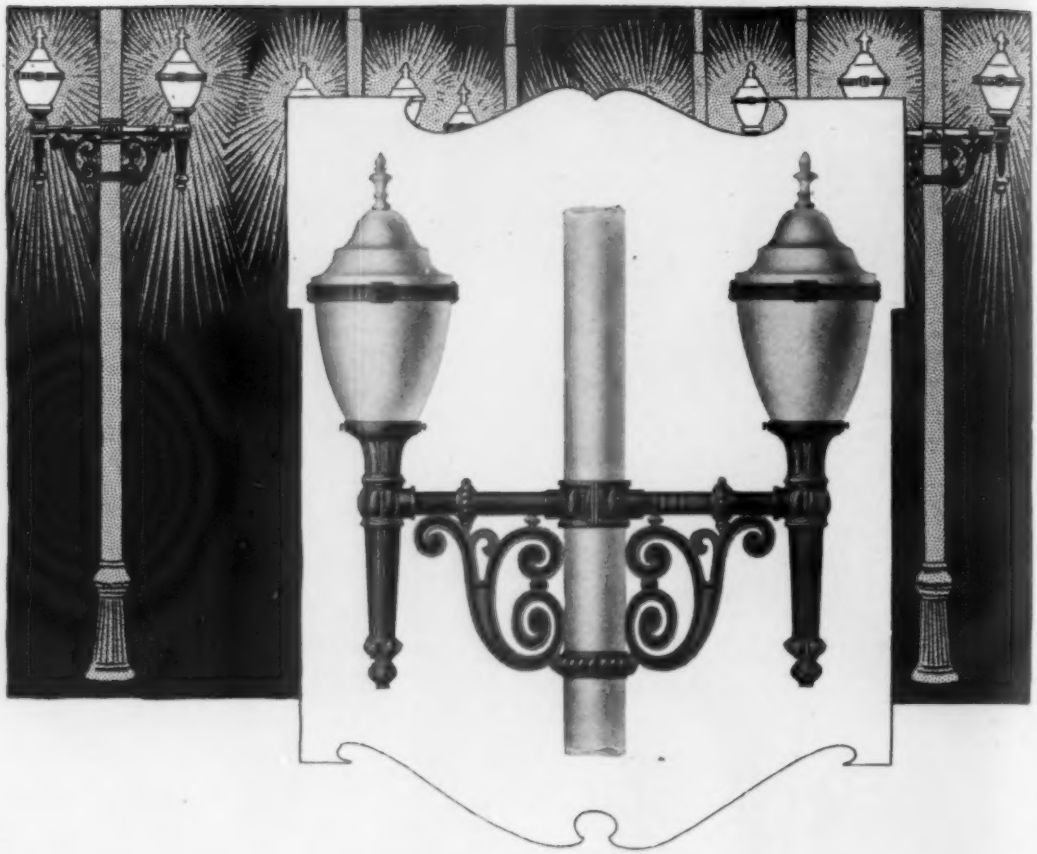
A nation-wide study of child marriages has been made by the Russell Sage Foundation, covering some 90 cities, and showing the great ease with which it is possible for children under 16 years of age to secure a marriage license and have the marriage ceremony performed. The facts presented in the report of this study are of importance to a every parent of minors, to clergymen, license issuers, educators, welfare workers, legislators, and voters.

A Report Upon the [Ohio] Laws Governing County Finances and Their Administration, With Particular Reference to Cuyahoga County.—Prepared by the Municipal Research Bureau of Cleveland, January, 1925. 78 quarto typewritten pp. A study of the fiscal organization and procedure prescribed by the State Legislature for Ohio counties, and showing how improvements in financial administration and management can be made by legislative action and by county officials. The measures proposed by the Bureau are intended to effect simplification and to enable officials to use common sense and at the same time satisfy the fundamental legal requirements. (Apply to the Bureau, 403 Electric Building, Cleveland, Ohio.)

Standardized Tests for Automobile Drivers.—By F. A. Moss. 19 quarto pp. in *Public Personnel Studies* for May, 1925. The tests given have been developed with the fundamental idea that it is possible, within limitations, to determine in advance which individuals can be expected to operate an automobile with a reasonable degree of safety to themselves and others. 35 cents. (Apply to Bureau of Public Personnel Administration, Institute for Government Research, 26 Jackson Place, Washington, D. C.)

The Handling of Conventions.—By John N. Van der Vries. One of a series of pamphlets issued by the Organization Service Bureau of the Chamber of Commerce of the United States, Washington, D. C. It contains an outline of the important details to be considered in preparing for and carrying through an annual meeting or convention of a trade, professional, or other type of organization. 12 pp.

Publicity as a Remedy for Municipal Bond Defaults.—By Alden H. Little, of Little & Moore, Inc., St. Louis, Mo.; Chairman, Municipal Securities Committee, Investment Bankers Association of America. Reprint from the March, 1925, issue of the "Mid-Continent Banker" and from the I. B. A. of A. Bulletin of March 31, 1925. 4 pp. Explaining the difference between "delays" and "defaults," and how publicity helps to enforce the penalty which a defaulting municipality must suffer, and showing the part which the Investment Bankers Association of America takes in such publicity. (Apply to the author, 408 Olive Street, St. Louis, Mo.)



THE Elreco Tubular Steel Pole has had a long career of usefulness. It has served street railway systems for more than thirty-two years.

The Combination Railway and Lighting Pole goes several steps farther. It is a double-use Pole—combining the features of two into one. Then, too, it has ornamental brackets and fittings which have been designed and assembled as a complete unit of our factory. It is, for this reason, easy to install—satisfactory in every respect.

In the brackets shown above, the design of the General Electric Lighting Fixtures is carried out exclusively. Write for details.

The Electric Railway Equipment Co.

NEW YORK OFFICE:
30 CHURCH STREET

Cincinnati, Ohio

Index of **Analysis of Natural Water in the United States.**—By W. D. Collins, and C. S. Howard, of the U. S. Geological Survey. Water-Supply Paper 560-C. 35 pp. Explaining through what means water analysis may be secured, and giving a list of published collections of analyses including all Federal and state reports of geological surveys, experiment stations, and health departments, with references to journal articles that contain collections of analyses. (Apply to Government Printing Office, Washington, D. C.)

Financial Statistics of State Governments: 1923.—A bulletin released by the U. S. Bureau of the Census June 10, 1925, giving the assessed valuation of property subject to general property taxes, total revenues, governmental-cost payments, and net debt, in a summary for the 48 states. 2 quarto pp. Preliminary statements for each of the 48 states have been released for publication as rapidly as the reports were received, beginning May 19, 1924. (Apply to the Bureau of the Census, Washington, D. C.)

The Community Chest Movement.—An Interpretation from the Point of View of the Business Man. By Halsted L. Ritter, President, American Association for Community Organization. 7 pp. "Salvation is collective, not individualistic, as far as health and living conditions, education and employment, morality and civic responsibility are concerned." As long as the supply lasts, the National Information Bureau, Inc., which is the Executive Secretary of the American Association for Community Organization, 215 Fourth Avenue, New York, N. Y., will be glad to send not to exceed 12 copies of this address to community chests requesting them.

The Practical Application of the Biochemical Oxygen-Demand Test.—By J. A. Childs. A paper presented at the Sixth Conference on Sewage Treatment, at Ames, Iowa, October 28-30, 1924. Bulletin 73 of the Engineering Extension Department, Iowa State College, Ames, Iowa. February 25, 1925. 6 pp. Discussing briefly the value of the test as applied to the routine work of the sanitary engineer or the operator of a sewage treatment plant. (Apply to the Department.)

A Park System for Long Island.—A Report to the Nassau County Committee, by Charles Downing Lay, Fellow American Society of Landscape Architects. Privately printed. February, 1925. 16 pp. Folding map. An analysis of the conditions which determine the need of certain features in a park system for Long Island, with recommendations for the planning of a system to supply these features. (Apply to the author, 101 Park Avenue, New York, N. Y.)

City Planning, Wakefield, Mass.—Report of the Planning Board to the Citizens of the Town, 1925. Also "A Proposed Plan for Wakefield," by Arthur C. Comey, City Planner, and a Proposed Zoning By-Law. 20 quarto pp., besides folding map. Views, plans, maps. The four sections of the proposed plan are: Circulation (drainage, railroads, transit, street system, sanitary sewerage, water-supply); Public Property (civic buildings, schools, playgrounds, parks and parkways, nature reserves); Private Property (zoning, building code, housing); Town Boundary. (Apply to the Planning Board.)

Visual Instruction.—Two pamphlets, by Dudley Grant Hays, Director, Visual Instruction, and William McAndrew, Superintendent of Schools. 1924. The Inception, Development and Present Status of Visual Aids in the Chicago Public Schools; 17 pp., illustrated. Suggestions on Visual Aids for Principals and Teachers; 20 pp., illustrated. The work of visual instruction has had a steady evolution in the Chicago public schools. These pamphlets show the means by which it is being carried on and by which it may be extended. (Apply to the Board of Education, Chicago, Ill.)

Typhoid Fever Epidemic in Chicago Apparently Due to Oysters.—By Herman N. Bundesen, M. D., Commissioner of Health, Chicago. 31 pp. Charts and tables. Reprinted from The Journal of the American Medical Association, February 28, 1925. An analysis of the possible causes of the recent typhoid fever epidemic in Chicago, an account of the measures taken to combat the epidemic, and a statement of the conclusions that resulted from the investigation. (Apply to the Department of Health, Chicago, Ill.)

The Increasing Importance of Special Taxes.—By George Vaughan, Special Counsel in tax matters for the state of Arkansas. An address delivered before the Seventeenth Annual Conference of the National Tax Association, in St. Louis, Mo., September 15-19, 1924. 20 pp. Emphasizing the fact that, though special sources of revenue are real and eligible as a supplemental and auxiliary resource, they cannot be relied upon at present as a substitute for the general property tax. (Apply to Alfred E. Holcomb, Secretary, National Tax Association, 195 Broadway, New York, N. Y.)

Effect of Oil Pollution of Coast and Other Waters on the Public Health.—Prepared by a committee consisting of F. W. Lane, Chairman, A. D. Bauer, H. F. Fisher, and P. N. Harding. Reprint No. 936 from the U. S. Public Health Reports, July 11, 1924. 6 pp. This paper is one of the appendices of a more comprehensive report made by the Bureau of Mines, in cooperation with the American Petroleum Institute and the American Steamship Owners' Association. 5 cents. (Apply to Government Printing Office, Washington, D. C.)

Recreative Athletics.—Prepared by the Playground and Recreation Association of America, 315 Fourth Avenue, New York, N. Y. Revised edition. 1925. Published by A. S. Barnes and Company, 7 West 45th Street, New York, N. Y. Handy size. 127 pp. Suggestions for programs of recreative athletics, games and sports, and for the promotion of physical fitness, designed for playgrounds, elementary and high schools, and industries. 60 cents. (Apply to the publishers.)

Early Diagnosis of Pulmonary Tuberculosis.—By James Alexander Miller, M. D., Professor of Clinical Medicine, College of Physicians and Surgeons, Columbia University. In the March-April, 1925, issue of the Bulletin of the New York Tuberculosis Association, Inc. 7 pp. Illustrated. The Editor of the Bulletin says: "In the United States there are now more than 65,000 sanatorium beds, the majority filled by patients in the advanced stages of tuberculosis. They represent an investment of $200,000,000 and cost annually more than $75,000,000 for maintenance. The return in lives alone could be trebled if cases of tuberculosis were discovered and treated when still in the early stage. Dr. Miller, drawing from his wide, practical experience, summarizes here most usefully the correct principles of the early diagnosis of pulmonary tuberculosis." (Apply to the Association, 244 Madison Avenue, New York, N. Y.)

Crippled Children in Chicago.—A Community Trust Survey, made, May-December, 1924, by Jessie L. Stevenson, supervisor of the crippled children work of the Visiting Nurse Association. Prepared for the Crippled Children Committee of Rotary Club of Chicago. Published by the Chicago Community Trust, 10 South La Salle Street, Chicago, Ill. 88 pp. Map of hospital facilities for cripples in Chicago; diagrams. The survey is reported under the following headings: Field Canvass—An Analysis of Significant Findings; Spastic Paralysis; Medical and Surgical Care—Hospitals and Dispensaries, Convalescent Care, Home Nursing Service for Cripples; Education for Cripples; Vocational Needs for Cripples; Problems of Relief and Delinquency in Families of Cripples; General Summary of Conclusions and Recommendations. (Apply to the publishers.)

Traction Franchise, Cincinnati, Ohio.—Report of the Traction Committee of the Cincinnati Chamber of Commerce, embodying certain recommendations relative to the pending ordinance granting to the Cincinnati Street Railway Company an extension of its franchise for 25 years. The suggested changes are in regard to value of property; powers and duties of company; municipal control; arbitration; appeal to courts; renewal, depreciation, sinking funds; city's control of funds; security issues; purchase by city; renewal of grant; working capital; paving; rates of fares; city construction; penalties; budget; directors' expenses; relations with other companies; other transportation; and office, records, etc. (Apply to W. C. Culkins, Executive Vice-President of the Chamber.)

Tests of a Public Utility Bond.—By Joseph Edwards Baker, of Blodget & Co. Published by Payson & Clarke Company, New York. 1925. 55 pp. A compilation of the standards of safety and legal requirements covering the purchase of public utility bonds by institutional investors, based on a careful study of the normal investment practice of many large insurance companies, educational institutions, and savings banks, and on an examination of the laws of various states. It presents eight tests of safety in such purchases, and explains the valuable function of an investment banker. (Apply to Blodget & Co., 34 Pine Street, New York, N. Y.)

Seven Years of Progress.—"Important Public Improvements and Achievements by the Municipal and Borough Governments of the City of New York, 1918-1925." Submited March 24, 1925, by John F. Hylan, Mayor to the Board of Aldermen. 205 pp. Photographs, map of proposed city subway lines. (Apply to Mayor's Office, New York, N. Y.)

Recommended Building Code.—For Cities with Populations from 25,000 to 150,000. Published by the Portland Cement Association, 111 West Washington Street, Chicago, Ill., April, 1925. 60 quarto pp. Revised edition of the code first issued in June, 1923, with a complete index. (Apply to the publishers.)

DID YOU READ?

The advertisement of the General Electric Company on pages 36 and 37 of the June issue of "The American City?" if not get your copy and read it carefully. Concrete, of course, was the material selected for the lighting standard as is the case where reduced costs of maintenance, beauty and efficiency are required.

The design and construction of the 12,000 posts which we made for the City of Chicago job are the results of investigation and recommendations of a staff of street lighting engineers of note. The best brains that money could buy were selected.

Municipalities will do well to adopt this post and lighting unit as they receive the benefit of engineering services which they could not afford to purchase. Prices are reduced to a minimum on account of large production.

Write us today for information on the largest street lighting job in the world.

CHICAGO CONCRETE POST COMPANY

Paul K. Fleming, *President*

Lawrence, Lamon & Leland Avenues

Chicago, U. S. A.

Port Development in California.—A study of the ports of Los Angeles, Long Beach, San Diego, and San Luis Obispo, by the Board of Engineers for Rivers and Harbors, of the War Department, in cooperation with the United States Shipping Board. This is No. 13 of a series on the ports of the United States, which have been prepared to meet the needs of the Government and to supply valuable data for the use of importers, exporters, manufacturers, railroads, steamship lines, and the general public. Although numbered 13 in the series, it is only the seventh report distributed. (Apply to the Board of Engineers for Rivers and Harbors, 2713 Munitions Building, Washington, D. C.)

Pennsylvania.—"Forty Thousand Square Miles Beautiful—Modern Highways and Historic Byways."—A profusely illustrated quarto booklet of 36 pp. with folding historical map. Published by the Pennsylvania State Chamber of Commerce, with the purpose of presenting the travel appeal of the state. It emphasizes the good roads and bridges, the historic shrines, the recreational features of the Keystone State. 20 cents. (Apply to State Publicity Bureau, Pennsylvania State Chamber of Commerce, State Chamber of Commerce Building, Harrisburg, Pa.)

List of References on Education for Citizenship.—Library Leaflet No. 30, issued, January, 1925, by the Library Division of the U. S. Bureau of Education. The material dealt with primarily is the training for citizenship given in the schools and colleges of the country, but material is included on community civics, training in citizenship for women, and for new Americans. 16 pp. (Apply to the Bureau of Education, Washington, D. C.)

Town Forests.—Their Recreational and Economic Value and How to Establish and Maintain Them.—By Harris A. Reynolds. With a Foreword by Charles Lathrop Pack, entitled "We Need More Forests." Published and distributed with the compliments of the American Tree Association, 1214 Sixteenth Street, N. W., Washington, D. C. 56 pp. Illustrated. The subject matter deals with the relation of town forests to town finances, recreation, and local industries, town forests as game and bird sanctuaries, the Massachusetts plan for town forests, and how to establish a town forest. The pamphlet also includes the program of the American Tree Association and the American Nature Association. (Apply to the publishers.)

Municipal Reports

BUFFALO, N. Y.—Annual Report, Children's Court, 1924
CHICAGO, ILL.—Annual Report, Department of Gas and Electricity, 1924
DETROIT, MICH.—Annual Report, City Plan Commission, 1924
INDIANAPOLIS, IND.—Annual Report, Department of Finance, 1924
ROCHESTER, N. Y.—Annual Report, Department of Charities, 1924
SEATTLE, WASH.—Annual Report, Department of Streets and Sewers, 1924
SOMERVILLE, MASS.—Annual Report, Street Commissioner, 1924
SPRINGFIELD, MASS.—Annual Report, Health Department, 1924
WEST VANCOUVER, B. C.—Financial Statement, 1924

On the Calendar of Conventions

JULY 13-16.—INDIANAPOLIS, IND.
International Association of Chiefs of Police. Annual convention. Secretary, George Black, Wilmington, Del.

JULY 20-AUGUST 1.—EVANSTON, ILL.
National School for Commercial and Trade Executives. Address: Robert B. Beach, Business Manager, Association of Commerce, Chicago, Ill.

JULY 21-23.—ROCHESTER, N. Y.
National Association of Comptrollers and Accounting Officers. Annual meeting. Secretary, Mark M. Foote, Room 501, City Hall, Chicago, Ill.

AUGUST 17-20.—DETROIT, MICH.
International Association of Municipal Electricians. Annual meeting. Secretary, William R. Arbuckle, 99 West 41st Street, Bayonne, N. J.

AUGUST 24-27.—CHICAGO, ILL.
Association of American Cemetery Superintendents. Annual convention. Secretary, W. B. Jones, Highwood Cemetery, Pittsburgh, Pa.

AUGUST 25-27.—SPIRIT LAKE, IOWA
League of Iowa Municipalities. Annual convention. Secretary, F. G. Pierce, Marshalltown, Iowa.

AUGUST 26.—ST. JOHN, N. B.
Union of New Brunswick Municipalities. Annual convention. Secretary, James King Kelley, 108 Prince William Street, St. John, N. B.

SEPTEMBER 1-3.—SUNBURY, PA.
League of Cities of the Third Class in Pennsylvania. Annual convention. Secretary, Fred H. Gates, Wilkes-Barre, Pa.

SEPTEMBER 1-3.—SUNBURY, PA.
Association of City Planning Commissions of Cities of the Third Class in Pennsylvania. Annual convention. Secretary, Leo J. Buettner, Johnstown, Pa.

SEPTEMBER 2-4.—TORONTO, ONT.
Ontario Municipal Association. Annual convention. Secretary, Horace L. Brittain, 180 Church Street, Toronto, Ont.

SEPTEMBER 4-5.—SIOUX CITY, IOWA
Iowa Association of Commercial Organization Secretaries. Annual meeting. Secretary, G. B. Eastburn, Marshalltown, Iowa.

SEPTEMBER 8-11.—ON BOARD S.S. RICHELIEU, EN ROUTE FROM MONTREAL TO QUEBEC
New England Water Works Association. Annual convention. Secretary, Frank J. Gifford, 715 Tremont Temple, Boston, Mass.

SEPTEMBER 14-17.—ROCKFORD, ILL.
American Institute of Park Executives and American Park Society. Secretary-Treasurer, Will O. Doolittle, Box 432, Rockford, Ill.

SEPTEMBER 21-24—HAMILTON, ONT.
Dominion Association of Fire Chiefs. Annual convention. Secretary, Chief James Armstrong, Box 56, Kingston, Ont.

SEPTEMBER 28-OCTOBER 2.—CLEVELAND, OHIO
National Safety Council. Annual congress. Managing Director, W. H. Cameron, 168 North Michigan Avenue, Chicago, Ill.

SEPTEMBER 28-OCTOBER 4.—PARIS, FRANCE
International Congress of Cities. Arranged by the Union Internationale des Villes et Communes and the Union des Villes et Communes de France. Secretary General-Director: M. Emile Vinck, Union Internationale des Villes et Communes, Rue de la Regence, 3bis, Bruxelles, Belgium. Paris headquarters: 29 Rue de Sevigne, Paris 3e. American headquarters: Office of **The American City Magazine**, 443 Fourth Avenue, New York.

SEPTEMBER 29-OCTOBER 1.—WESTERN UNIVERSITY, LONDON, CANADA
Canadian Tax Conference and Canadian Civil Service Research Conference of the Citizens' Research Institute of Canada. Secretary, H. L. Brittain, 189 Church Street, Toronto, Canada.

SEPTEMBER 29-OCTOBER 2.—LOUISVILLE, KY.
International Association of Fire Engineers. Annual convention. Secretary, James J. Mulcahey, City Hall, Yonkers, N. Y.

OCTOBER 5-10.—ASHEVILLE, N. C.
Playground and Recreation Association of America. Annual Recreation Congress. Secretary, H. S. Braucher, 315 Fourth Avenue, New York, N. Y.

OCTOBER 12-15.—TULSA., OLKA.
Southwest Water Works Association. Annual convention. Secretary, R. D. Morgan, Mexia, Tex.

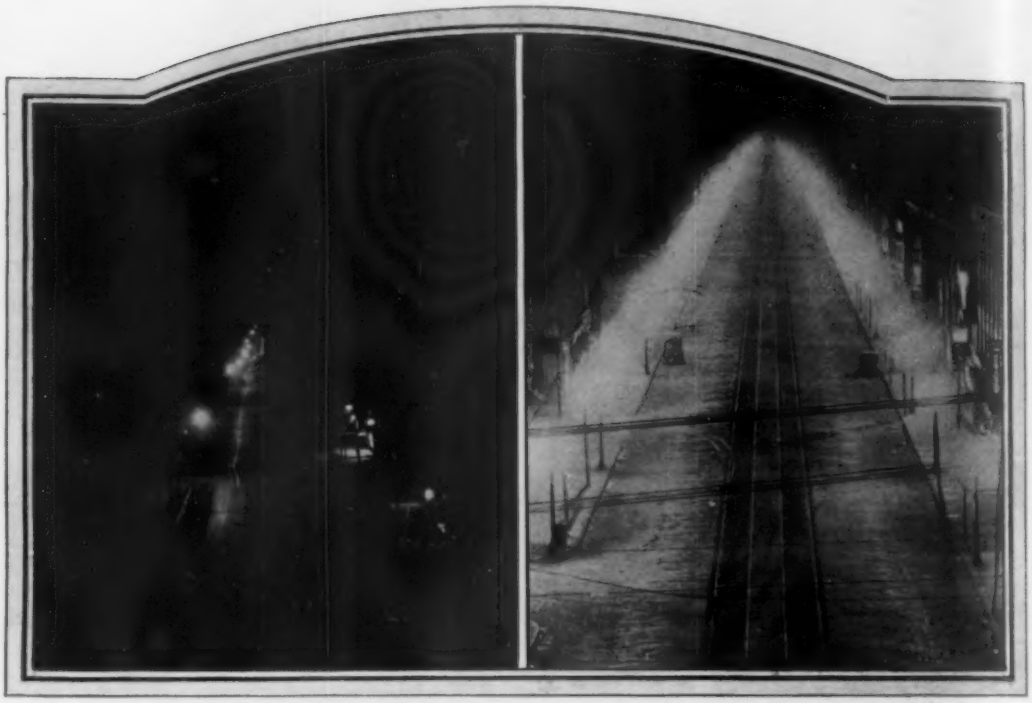
OCTOBER 26-28.—KANSAS CITY, MO.
National Association of Commercial Organization Secretaries. Annual meeting. Secretary-Treasurer, A. V. Snell, Chamber of Commerce, Jacksonville, Fla.

OCTOBER 26-29.—DES MOINES, IOWA
American Society for Municipal Improvements. Annual convention. Secretary, Charles Carroll Brown, P. O. Box 1134, Lakeland, Fla.

NOVEMBER 17-19.—GRAND RAPIDS, MICH.
International City Managers' Association. Annual convention. Secretary, John G. Stutz, Lawrence, Kans.

NOVEMBER 17-19.—PITTSBURGH, PA.
Joint Convention of National Municipal League, American Civic Association, Governmental Research Conference, and National Association of Civic Secretaries.

JANUARY 11-15.—CHICAGO, ILL.
American Road Builders' Association. Annual convention and Road Show. Secretary, Ethel A. Birchland, 37 West 39th Street, New York, N. Y.



Woodland Avenue, Cleveland, the night BEFORE the Whiteway was turned on.

The same street photographed from the same position twenty-four hours later.

Gloom Street or Cheer Street

For many years this street was dark and dangerous; a safe place for thugs and highwaymen to ply their trade; and a fertile field for traffic accidents. That was the *Before* picture shown above.

Then one night last year the White Way was turned on and that same street became bright, safe and beautiful. Almost overnight it became a better business street because it was well dressed and attractive. Real estate values increased, traffic accidents decreased and crime was reduced 50 per cent.

Turning Gloom Street into Cheer Street;—in more than a thousand cities and towns has been our principal business for seventeen years. Possibly we can show your town "The Right Way for The White Way."

Your copy of this valuable book is now ready. A copy should be in the hands of everyone interested in making his city's streets Brighter, Safer, More Beautiful. "Better Street Lighting" Book No. 52 mailed on request.

THE UNION METAL MANUFACTURING CO.
CANTON, OHIO

UNION METAL
LAMP STANDARDS

News and Illustrations

Items of Interest to City, Town and County Officials, and Others Concerned with the Economical Construction and Efficient Operation of Public Improvement Undertakings

Extreme Simplicity in Graphic Water-Level Recorder

A graphic water-level recorder which has all of the features of refinement common to Gurley instruments and yet has been reduced to an extremely simple piece of mechanism, was exhibited by W. & L. E. Gurley, Troy, N. Y., at the American Water Works Association Convention at Louisville, Ky.

There are a number of methods of translating the movement of a water-level to a record sheet, but that which most closely follows the slightest change is a float protected from disturbing wave or wind action, riding the water surface and connected to the record drum by a suitable tape. The sensitiveness of the float movement varies directly as the square of the diameter. A 10-inch float such as is used in the 1925 model Gurley recorder is four times as sensitive as a 5-inch float. Greater length or weight of float does not increase its sensitiveness.

The record sheet is 12 inches long and is attached around a cylinder or drum 12 inches in circumference. The record of stage is made around the cylinder, and it will continue to record by successive revolutions any change of stage, limited only by the freedom of the float and the counterweights. This is a valuable feature on streams which have a flood season. By selecting a gear ratio which takes care of the normal rise and fall within one revolution, a large-scale record is obtained which can be conveniently read and used. If the rise or fall of the water causes the cylinder to rotate more than a complete revolution, the pencil continues to record on the full scale as many revolutions as the cylinder makes. Only in case of exceptionally rapid rise or fall will any confusion take place, in which event a faster time scale should be used.

A FLOAT-OPERATED, WEIGHT-CONTROLLED WATER-LEVEL RECORDER

By simply lifting a lever, the cylinder can be disengaged from its connection with the float, and the cylinder freely rotated to the most convenient position for removing and replacing the record chart. The cylinder can then be accurately returned to its former location, which is determined by a locating pin. The cylinder is slotted longitudinally to receive the creased end of the record sheet. Successive sheets are thereby accurately located and firmly held in place. The one size of record sheet is of convenience to the engineer in studying the record and in filing it away. Changes in scale can also be made by proper marginal notes relating to time and elevations used. The over-all size of the sheet is 8½ x 13½ inches, the record service being 7½ x 12 inches for the weekly time scale and 8 x 12 inches for other time scales.

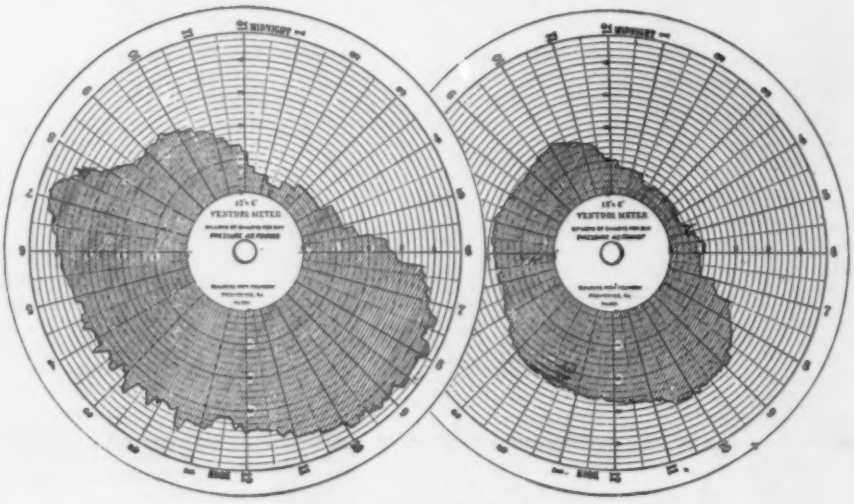
A durable weight-driven marine clock controls the accuracy and continuity of the time element. The clock is easily detached from the register, and the arrangement is such that a spare clock can be utilized during periods of cleaning. Since the clock is completely enclosed in a metal case, it is dust-proof and water-proof and will rarely need to be removed except at a regular interval for oiling. Two different clocks may be had, one to give a weekly time scale and the other to give a daily time scale.

Sea water and water which is highly corrosive because of trade wastes or alkali have practically no effect on the parts of this recorder, as rust-proof metals are used throughout. The float and sprocket-wheels are of white metal, the tape of Monel metal, the frame, pencil carriage, gears and gear holder of bronze, the support rods of nickel alloy, the cylinder of brass, and the shafting of rustless steel.

Mt. Clemens, Mich., Increases Well Capacity

In 1920 a 12-inch well was sunk for the city of Mt. Clemens, Mich., yielding 350 gallons per minute—with a medium-fine slot Cook strainer, made by A. D. Cook, Inc., Lawrenceburg, Ind. After four years of service the strainer was pulled, made coarser, and reset so that the well now yields 500 gallons per minute. Pulling the strainer was accomplished by a very simple method and without injury to it.

AFTER THE BATTLE



Venturi Charts Which Tell the Story

(Greatly reduced in size)

The BATTLE between CONSERVATION and WATER WASTE, if successfully waged, means wise provision against the dreaded period of water shortage.

With VENTURI METERS on the main pump and distribution lines, the winning of the battle becomes a practical certainty.

BUILDERS IRON FOUNDRY

PROVIDENCE, R. I.

"Builders of the Venturi for 34 Years"

Tractor Versus Ox in Cuban Road Building

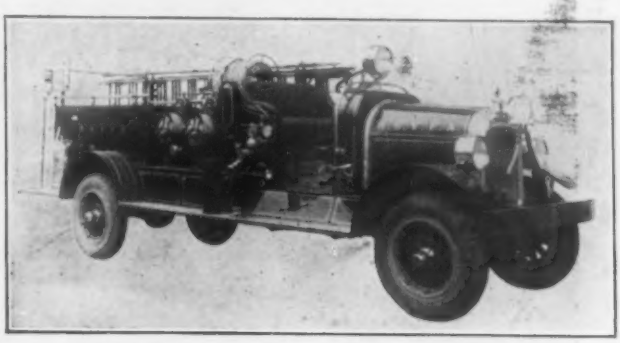
Six and eight head of oxen have always been thought necessary for hauling and building in Cuba. These oxen are unbelievedly slow and have a hauling capacity of but 3½ tons. Also, they are very expensive, costing $200 per head, with a heavy up-keep cost and much wasted time. According to Frank L. Jursik, the Cuban distributor, and E. E. Kuhn, a representative of the Trackson Full-Crawler Company, Milwaukee, Wis., Cubans are discarding the traditional ox for the Trackson-Fordson in road construction, thereby greatly increasing their road-building efficiency.

The Trackson traction has been found more important than speed, for many of the Cuban roads are wretchedly poor. The streets are seldom repaired and there are no real highways. During the six to eight months' rainy season the roadways are washed away quite rapidly. Holes one foot deep are common, and the two-wheeled ox-carts used for hauling sugar cane and logs cut ruts more than 8 inches deep in the roads, even in the driest months. Public sentiment is now calling for a central highway which will run across the island and be used throughout the year, but the construction has not yet begun.

The era of the tractor has brought new road construction methods that will encourage street repair and maintenance, and the agitation for the central highway is the first tangible proof. The illustration reproduced below shows a Trackson-Fordson working on a job in Havana. A rooting plow was attached to the tractor, and an asphalt and rock road was plowed. At Florida, Cuba, a road was built across a field with a big 7-foot blade Russell grader attached to the tractor. The field was not only furrowed with ruts cut by the two-wheeled carts, but was studded with tree stumps, logs, and loose sugar cane. Building a road across such a field as this would have been impossible with a wheeled tractor, as the added traction given by the Trackson tread was necessary.

At Camaguey it was necessary to get a special permit from the Mayor to haul a big load of paving brick in an ordinary dump-wagon through the main city streets and through the mud-holes. This was the first time such permission had ever been granted and it was given to the Full-Crawler operator because the Trackson has no permanent cleats. Near this city the tractor climber 18 per cent hills, hauling 1,000 feet of mahogany logs on a heavy four-wheeled wagon. No grouters were used until a series of small hills were reached which were covered with small lava rocks, and the grouters were added to give the machine greater traction.

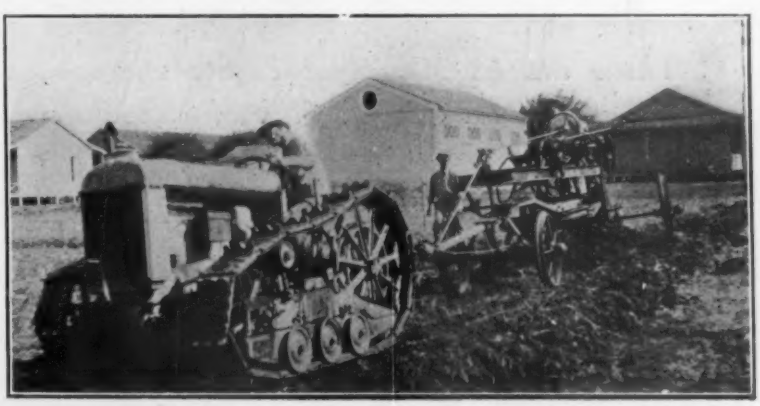
During this demonstration trip, which was aimed to show that the Trackson Full-Crawler could increase the draw-bar power of the Fordson more than 30 per cent, Mr. Kuhn and Mr. Jursik met the line crew of the Phoenix Utility Company, which is now running a high-tension electric cable across and along the length of Cuba, and pulled three lengths of ½-inch diameter cable each a mile long across the field, stretching them over electric poles. This was at Ciego de Avila. The standard Fordson which the crew was using could not quite pull two lengths of cable a mile long across the rutty field.



DELUGE PUMPER FOR A VIRGINIAN CITY

New Pumper for Hot Springs

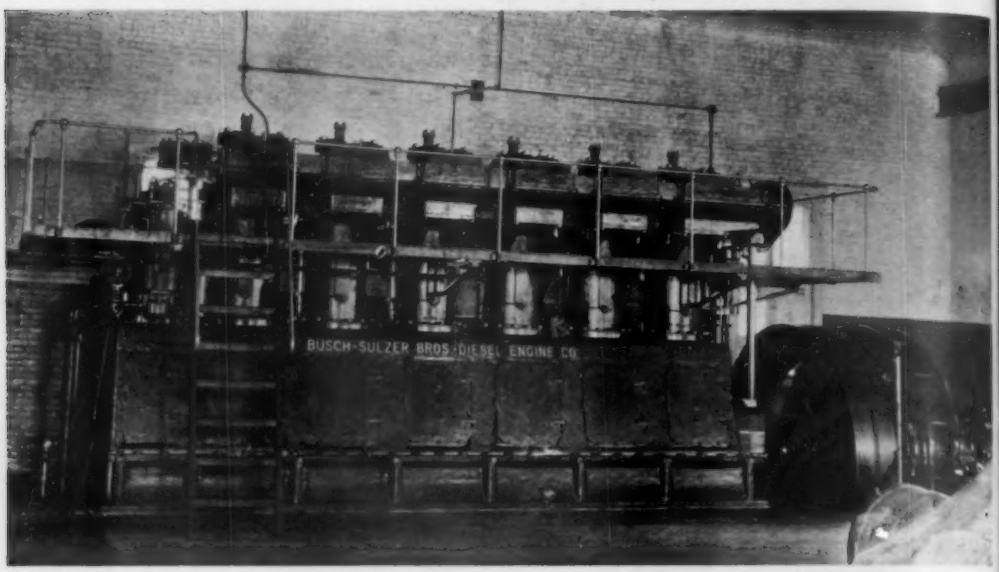
The accompanying illustration shows a new Deluge Master fire fighter which was recently delivered to the city of Hot Springs, Va., by the Prospect Fire Engine Company, Prospect, Ohio. This latest design is a triple combination pumper, chemical, and hose body completely equipped with a 350-gallon Deluge rotary pump, two 35-gallon chemical tanks, 1,000 feet of hose, ladders and other necessary miscellaneous fire-fighting equipment.



BUILDING A ROAD ACROSS A CUBAN FIELD, USING A RUSSELL STANDARD GRADER WITH 6-FOOT BLADE DRAWN BY A TRACKSON-FORDSON

MENASHA, WISCONSIN—

The First City in the World to Install Diesels



In 1905 this municipality installed 2- 75 B.H.P. Diesel engines to drive triplex pumps.

In 1911 they added a 225 B.H.P. engine belted to generator to carry street lighting and motor driven pumps.

In 1913 another 225 B.H.P. engine was purchased to handle the increase in load.

In 1924 the 600 B.H.P. unit illustrated above, was put in service and plans made for future Diesels.

There are 52 Municipal Plants equipped with Busch-Sulzer Diesel Engines of 28,505 B. H. P.

BUSCH-SULZER BROS.-DIESEL ENGINE CO.

ST. LOUIS

BACKFILLING WITH A TRACKSON FULL-CRAWLER OUTFIT EQUIPPED WITH A BLADE PLOW

Backfilling a Sewer Trench

Backfilling a sewer main trench on Merrill Avenue, Rochester, N. Y., where the trench was 6 feet deep and from 6 to 10 feet wide and where the sides of the trench kept caving in, was one of the recent jobs of a Trackson Full-Crawler equipped Fordson, owned by the Passena Construction Company of Rochester. The greater traction which is possible by substituting the crawler tracks made by the Full-Crawler Company, 500 Clinton Street, Milwaukee, Wis., for the round wheels of the Fordson, is responsible for the increased power which makes it possible for a small tractor like the Fordson to operate successfully in ground conditions like these, and also in sand, mud, snow, as well as over hard roads.

The Trackson is a combination of steel frame, sprockets, and tracks which is attached to the standard Fordson to increase its traction. It does not change the operation of the Fordson in any manner. The Trackson-Fordson is steered by brakes on the rear sprocket. A slight turn of the steering wheel to either side locks the brake on the inside of the turn and allows the outside track to run freely. In this way the tractor can turn around in its own length.

Travel over loose soil is made easy by the wide tracks which distribute the pressure of the weight of the machine over a relatively large area. On very muddy ground and rocky surfaces travel is made easier by detachable grouters, one bolted to each track shoe—38 in all. Thus equipped, the 2-ton Trackson-Fordson is able to go wherever a horse can and often where a horse cannot travel.

A Small Portable Asphalt Plant for Patch Work

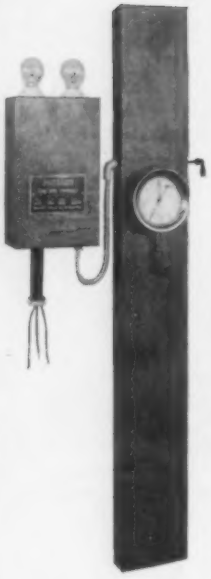
Small portable asphalt plants for patch work in repairing streets have been decidedly scarce. The Chausse Oil Burner Company, Elkhart, Ind., has recently brought out a new portable asphalt outfit which is designed for municipalities and contractors for use in laying hot asphalt in repair work and for resurfacing holes in concrete roads or for filling cracks in concrete pavement. This plant embodies a number of interesting features not hitherto provided in repair plants.

The Chausse machine has been in actual service, where it has shown a marked ability to heat the proper material, mix and deliver it ready for laying on a more economical basis than can be obtained by hand methods, or by using a large-capacity asphalt plant on a small output. The machine was designed to heat enough stone, sand, and asphalt for 3 cubic yards per day on street or road locations. In service it has shown itself able to nearly double this output, and when used for heating reclaimed or previously mixed asphalt it will produce about 10 cubic yards per day.

The plant consists of a gasoline engine, an air-compressor, an asphalt tank with capacity of about 80 gallons, a tool-heater compartment, 18 individual batch-boxes, a mill type mixer, and four standard Chausse oil burners. Sufficient fuel capacity for one day's run is provided. The outfit is mounted on a chassis which is self-propelling at low speeds for self-movement in repair work, but which is not intended for driving the

CHAUSSE PORTABLE ASPHALT PLANT IN SERVICE

To Keep Your Elevated Tank Full



A Johnson Tank Level Controller will do just that for you. It will keep it full and no more—with no attention from any one. This new controller will start the pump at any predetermined water level and will stop it when the water gets as near the top as you wish to carry it. And the tank will never run over. A Johnson Tank Level Controller will give your town a full tank all the time—automatically.

We fully guarantee this instrument to do everything we say it will. Try it for 30 days and prove it.

HALF PRICE

Nothing advertises the Johnson Tank Level Controller as does the controller itself. Persons who observe it in operation are amazed at its accuracy. Therefore to get working samples widely distributed, quickly, we are going to sell Johnson Tank Level Controllers at half price to the two towns in each state that first apply for them. This offer will not be repeated and good only during July.

Illustrated catalog upon request.

EDWARD E. JOHNSON, Inc.
2304 Long Ave.
St. Paul Minn.

JOHNSON
Tank Level Controller

machine over extended distances. A standard make of 4-cylinder, 4-cycle unit-type engine with governor drives a 2-cylinder standard make of air-compressor with automatic unloader. The engine also drives the mill type mixer and furnishes traction power. The compressor not only furnishes pressure for the fuel supply to the burners, but also is used for blowing out holes and cracks and thus cleans them much more thoroughly than can be done with a broom. It also has capacity for operating one or two pneumatic tools for ramming or picking or any other use for which a pneumatic tool can be used to advantage on repair work.

The use of individual batch-boxes is a novel arrangement in this machine and was made on the advice of prominent asphalt engineers who were consulted during the designing of the apparatus. Each batch-box holds 1½ cubic feet of material and thus offers a convenient method of keeping materials separate and of measuring them. These boxes can be filled at the municipal or contractors' yard and delivered to the machine without requiring dump-carts and shoveling on the street. Reclaimed asphalt on the street can be put into these batch-boxes and be remelted in the machine in one-half hour, ready for use again. The batch-box arrangement also permits putting new material into the heating compartment when hot stuff is removed. The Chausse machine is not intended as a sand dryer, but is primarily a heater, and it is assumed that dry sand will be delivered to the machine. In urgent cases, however, the sand can be dried. When small quantities of asphalt are being used, the mixer can be maintained at proper heat all day. Thus, there is no delay in bringing material from some central station and there is no loss due to the arrival of hot stuff at a time when it cannot be laid. The hopper over the mixing drum also holds 1½ cubic feet, so that if any material is shoveled into the hopper it can be readily measured. The mixing drum is equipped with impeller blades which rotate in a direction opposite to those of the drum, thus providing proper mixing.

The Chausse burners are so placed that they give an adequate distribution of heat. Two of them are amidships under the tool heater compartment and air-compressor tank and have capacity to bring 80 gallons of asphalt to a working temperature in about 35 minutes. Usually one burner is then turned off, as the other burners will maintain the asphalt at the proper temperature. The other two burners are at the rear of the machine, where they not only keep the mixing drum hot, but project the heat into the batch-box heating chamber. Surplus heat from the metal heaters also circulates around the batch-boxes. The top of the machine is insulated with 1½ inches of asbestos so that the air-supply tank and fuel tank are not subject to heat and so that the greatest amount of heat is retained in the batch-box compartment.

This machine weighs 6,000 pounds empty, is 12 feet long over-all, with standard treads. Its operating cost has shown itself to be low and it is being sold at a price which places it well within the reach of cities of 30,000 population and over, and by contractors who handle patch work. Only about 25 gallons per fuel per 10-hour day is required for heating purposes. With this machine three men can handle a full patching program.

A SUBSTANTIAL ELECTRIC FLASHING BEACON

A New Flashing Type Traffic Beacon

A NEW type of traffic beacon, which flashes its signals through four lenses at the top of the unit, has been developed by the Evernu Century Sign Company, 100 Colonial Road, Boston, Mass. This flashing beacon makes use of Edison electric equipment, similar to that used for the operation of railroad train signals for the last fifteen years. The flashing mechanism is very simple, requiring practically no attention, flashing at at the approximate rate of 60 flashes per minute.

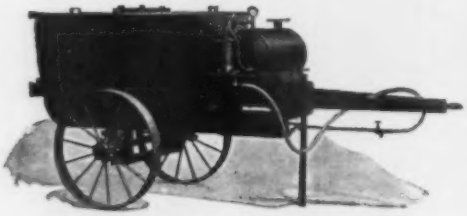
The beacon rests on an armored base 30 inches square at the bottom, 24 inches square at the top, and 18 inches high, with the battery container, which is 16 x 12 inches deep, supported in the center of the base. The space outside of the container is filled with concrete. The cover to the base is attached to the upright column, so that the cover, column, and all the upper parts of the beacon tip back, to readily permit access to the battery container. The pedestal is a smooth, round column, 7 inches in diameter at the base and 4 inches in diameter at the top. The lamp bulb and lantern heads are attached to the top of the column. It is possible to mount direction signs above the lamp, this facilitating the movement of traffic. The energizing elements are contained in four splash-proof sealed porcelain coated metallic cells of 3 volts capacity each, connected in series, and operating through an oscillating relay. This equipment provides 500 ampere hours, and as the length of the flash instant is approximately 1/20 of a second, the consumption period is in excess of one year.

This equipment is sold under the condition that the Evernu Century Sign Company will advise the purchaser once each year of the need of replacement of battery contents, which are inexpensive.

FOR ROAD CONSTRUCTION & MAINTENANCE

LITTLEFORD

TAR AND ASPHALT HEATERS



The new No. 84-W Oil Burning Tar and Asphalt Heater. 50, 75 and 100 gallons capacity

We're shipping more Littleford Tar and Asphalt heaters than ever before. And most of them are going to keep company with Littleford heaters sold in previous years. Evidence enough that one Littleford heater placed on the job demands a duplication of its dependability when more heaters are needed.

A type for every kind of maintenance work and a capacity for every requirement, long life, convenience in handling, economy of operation make your choice of Littleford heaters a safe one. Write for prices and complete details.

Every maintenance official should have a copy of our new service catalogue for their files. Just clip the coupon below and mail it.

The new No. 69 Maintainance Tar and Asphalt Heater with specially designed barrel hoist attached. 60, 110, 165 gallons capacity.

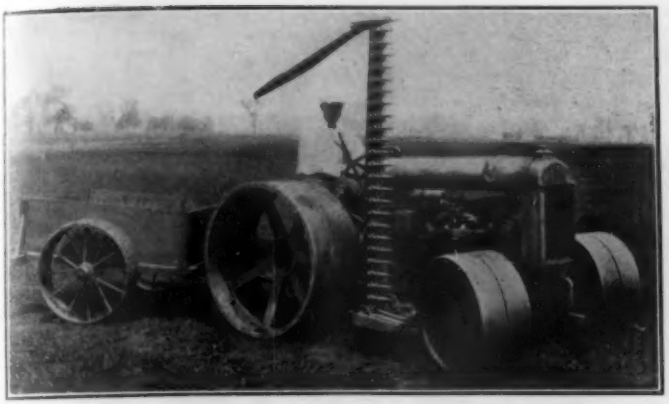
LITTLEFORD BROS.
500 East Pearl Street
CINCINNATI, O.

The new No. 90 Oil Burning Tool Heater

The No. 68 "Patrol" Heater for the small job where small quantities of heated materials meet the requirements. Capacity 10 gallons.

Send me your new 32-page catalogue.

Name..... Address.....



DETROIT ROUGH-CUTTER MOWER ATTACHED TO FORDSON
This unit, with gang plows behind, can handle all mowing requirements of public grounds and golf courses

A Fordson Mowing Unit

A rough cutting mowing unit which can be used in cutting long grass in parks and around golf courses or for cutting weeds and grass on the roadside, has been developed by the Detroit Harvester Company, 6535 Livernois Avenue, Detroit, Mich.

This unit has been developed particularly for use with the Fordson and requires no changes whatsoever in the tractor for its adaption. A counter-balanced drop-forged Pitman fly-wheel makes the Detroit mower capable of Fordson speed without vibration. All the gears are upset on the shaft, which means that they are part of the shafts themselves, thus eliminating keys or pins which might become loose. All gears and shafts are made of specially heat-treated alloy steel to insure the greatest durability and longest life, as well as being mounted on ball bearings.

The power for the mower is taken directly from the pulley gear, so that the mower runs at motor speed and not at wheel speed. Any desired cutter bar speed can therefore be obtained, regardless of the speed of the tractor. The cutter can operate when the tractor is not in motion. The heaviest grass can be cut with the Fordson operating at low or high speed, which is an exclusive feature of the Detroit mower. The cutter bar is always in plain view of the operator, and the control levers at his right hand are always within easy reach. The mowing bar is optional 5 or 6 feet long; and two separate knives are furnished with each mower.

A special coil spring in the front drag-bar of the mower absorbs the shocks when running into stumps or other obstructions, thus obviating the necessity for any safety release. This coil also eliminates any danger of injury to the mower or tractor.

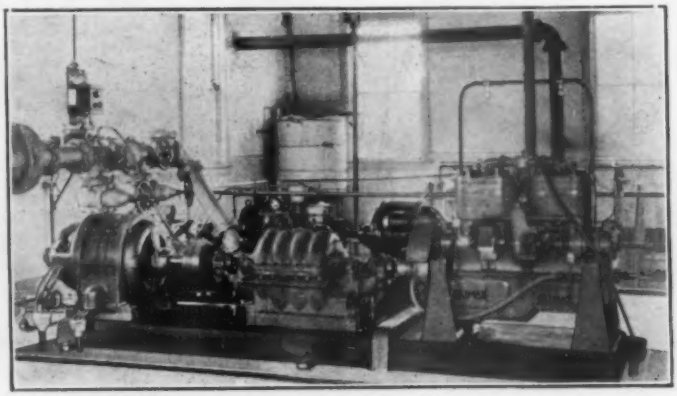
Full-Crawler Company Announces New Distributors

The Full-Crawler Company, 500 Clinton Street, Milwaukee, Wis., manufacturers of Trackson Full-Crawler treads for Fordsons, has announced the appointment of the H. R. Hooper Company, Youngstown, Ohio, as distributor for Trackson equipment in the Cleveland branch territory of the Ford Motor Company. The Motor Power Equipment Company, St. Paul, Minn., has been made exclusive distributor in the St. Paul, Minn., and Fargo, N. Dak., branch territories of the Ford Motor Company. Both distributors will carry a complete stock of standard Trackson Full-Crawlers and repair parts.

Keeping a Town Wet

The town of Williston, N. Dak., has solved the problem of keeping "wet" legally in an interesting manner. Williston has a commission form of government which looks after its water-supply carefully. There are two pumps in the water-works pumping-station, one of which is powered with a Climax engine, made by the Climax Engineering Company, 1 West 18th Avenue, Clinton, Iowa. This installation was made to insure the water-supply in case of trouble with the electric motor or failure of the power supply. The Dayton-Dowd pump which is direct-connected to the Climax engine is a 4-inch, 4-stage unit, delivering 500 gallons of water per minute against a maximum head of 200 feet at 1,150 revolutions per minute. The motor is the General Electric 50-horse-power, three-phase, 2,200-volt, slip-ring type, and the engine is a Climax Model-TU. Couplings are arranged to connect the pump to either power unit as required, and automatic starters are provided.

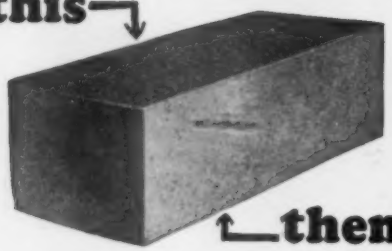
A test shortly after the plant was installed showed the engine speed to be 1,225 r. p. m. maximum and 1,100 r. p. m. minimum, with the pump working on a head averaging 190 feet. Part of the test consisted in running the pump for ten hours against 90 pounds pressure without a stop at 1,175 r. p. m. The test was carried through



COMBINATION UNIT FOR INSURING WATER AT ALL TIMES IN WILLISTON, N. DAK.

Two-Sided Value

Use this



then this

DOZENS of communities have made a delightful discovery in the past few years. They have discovered that brick laid in pavements a generation ago *is actually worth more today than when laid.*

One after another has faced the need of taking up a pavement battered and roughened by 25 to 35 years of increasing traffic, only to discover that the brick when lifted out is not only in perfect shape for re-laying but, if offered for sale, could be sold for even more than its original cost!

A few of the communities that have made this profitable discovery are Pensacola, Jacksonville and Duval County, Fla., Vicksburg and Meridian, Miss., Lancaster and Bucyrus, Ohio, Lynchburg, Va., Wheeling, W. Va., Sewickley and Butler, Pa., and Omaha, Nebr.—and there are scores more who will profit by the same fact in the next few years.

VITRIFIED **Brick** **PAVEMENTS**

Pave for the future—pave for long life and low upkeep—pave for high salvage value—pave to outlast the bonds—pave with vitrified brick.

OUTLAST THE BONDS

NATIONAL PAVING BRICK MANUFACTURERS ASSOCIATION, ENGINEERS BLDG., CLEVELAND, OHIO

Advocate Brick—
the pavement that outlasts the bonds.

successfully, showing everything running smooth and cool.

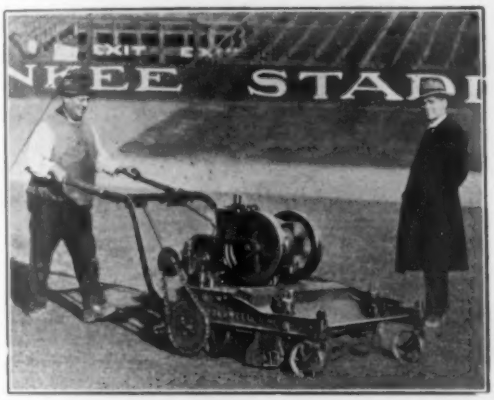
The other and smaller pumping unit consists of a Keystone 6-inch single-stage pump with a capacity of 1,000 gallons per minute at 65 foot head, operating at 850 r. p. m. This is direct-coupled to a Climax Model-KU engine. There is no electric motor coupled to this pump.

An Effective Power Mower

The Model-H 30-inch power mower is manufactured by the Coldwell Lawn Mower Company, Newburgh, N. Y., which will cut from 6 to 8 acres of lawn per day, thereby saving many times its cost in labor, is built to cut long, tough grass, with sufficient reserve power for cutting on steep grades.

In this mower the roller is the same width as the cutting knives, which insures a proper, uniform rolling of the entire lawn with each cutting. This rolling smooths the surface, conserves the moisture, and is of great benefit in the control and elimination of lawn pests. This machine can be used as a motor roller alone, when desired.

Another distinctive feature found only in Coldwell motor mowers is the simple lever control and



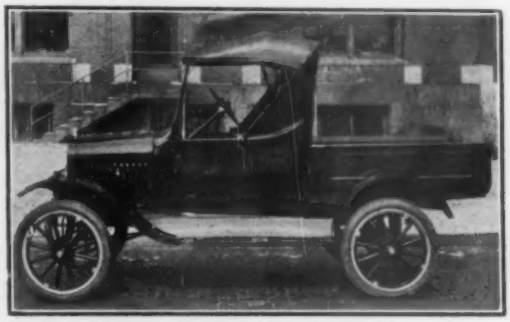
A COLDWELL MODEL H MOWER IN ACTION IN THE YANKEE STADIUM, NEW YORK

transmission of power directly to the revolving cutters, as well as to the drive roller. The motor is a 2½-horse-power Fuller & Johnson 4-cycle engine equipped with dual ignition. A patent lifting arrangement allows the revolving cutter to be raised when passing over obstacles or when crossing roads. A standard automatic grease gun is furnished with each mower. This is a simple and sure means of properly lubricating all bearings, thereby increasing the efficiency and lifetime of the mower.

These walk-type mowers represent the result of 26 years' experience of engineers who have specialized in motor mower construction and design. Many of them have been in use for years and are used exclusively on a large number of estates and parks.

New Sullivan Branch Office

The Sullivan Machinery Company, 122 South Michigan Avenue, Chicago, Ill., has announced the establishment of a new branch office at 208 West Market Street, Pottsville, Pa., in conjunction with the Pottsville Supply Company, Inc., which has been local agent for Sullivan equipment for several years. Sullivan hammer drills and repair parts, air hose, drill steel, air-compressors, portable hoists, and drill sharpeners will be kept in stock for the convenience of customers. A. K. Owen will continue in charge under the direction of Edward W. Noyes, District Manager at Scranton, Pa.



THE NEW FORD LIGHT BODY ON A RUNABOUT CHASSIS

New Ford Delivery Truck

The Ford Motor Company, Detroit, Mich., has announced a new light trucking unit, the equipment of which is a combination of the standard Ford runabout with the rear deck replaced by a pick-up body. This truck is particularly valuable for rapid transportation of light loads, such as are common in water, sewer, and electric departments and for contractors. There is an all-steel body available securely attached to the frame of the chassis with rear door adjustable chains, side flanges, and steel floor strips with sunken bolt heads. The inside dimensions of the body are 40¾ inches by 56 inches, and the height from the floor to the top of the flare is 13 inches.

Water Purifiers Meet

The Associated Manufacturers of Water-Purifying Equipment, through its Executive Committee, is considering plans to extend the activities of the Association along various lines. The Associated Manufacturers' specifications for boiler feed waters, prepared by its Boiler Water Committee, are probably to be accepted as standard by the American Society of Mechanical Engineers. Its standard specifications for pressure filters have been adopted by the American Water Works Association for inclusion in the new water-works manual of the Association.

The officers of the Associated Manufacturers of Water Purifying Equipment are: Churchill Hungerford, Hungerford & Terry, Inc., General Chairman; Jesse W. Roberts, Roberts Filter Manufacturing Company, Vice-Chairman; Arthur M. Crane, Secretary-Treasurer. The Executive Committee comprises the officers mentioned above and M. F. Newman, Wm. B. Scaife & Sons Company; J. W. Ledoux, Simplex Valve & Meter Company; W. J. Orchard, Wallace & Tiernan Company, Inc.; J. D. Yoder, Cochrane Corporation; and G. F. Hodkinson, American Water Softener Company.

Dustless Roads at Small Cost

A motor truck with Spreader attached applies Solvay Flake Calcium Chloride rapidly and economically.

Year after year, more and more states, counties and municipalities are successfully using Solvay Flake Calcium Chloride as a combined surface road binder and dust layer. It presents to the highway engineer the outstanding appeal of ease of application and low cost of maintenance.

SOLVAY *Flake* Calcium Chloride

"The Natural Dust Layer"

Solvay Flake Calcium Chloride absorbs moisture from the air, binds the road surface and maintains it in a firm, resilient, dustless condition. It is the perfect material for town or country road treatment. Solvay Flake Calcium Chloride does not track or stain and is without effect on automobile tires and finishes.

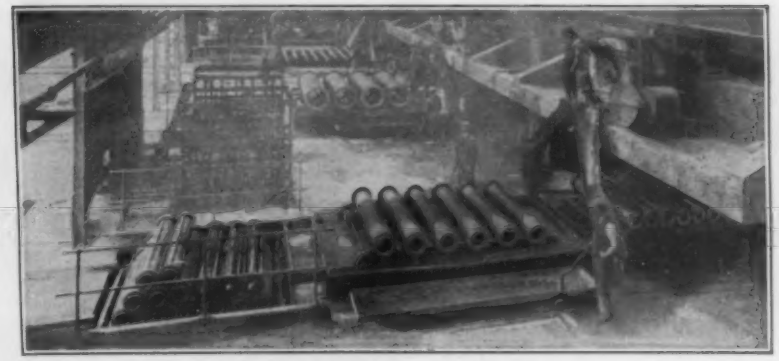
Seventy-five conveniently located distribution points insure prompt delivery with minimum transportation charges. Solvay is supplied in 100-pound moisture-proof bags and 375-pound non-returnable drums.

Write for booklet No. 1056.

THE SOLVAY PROCESS COMPANY

Wing & Evans, Inc., *Sales Dept.*

40 RECTOR STREET NEW YORK CITY



MOLDING MACHINE FOR SPINNING HUME PIPE

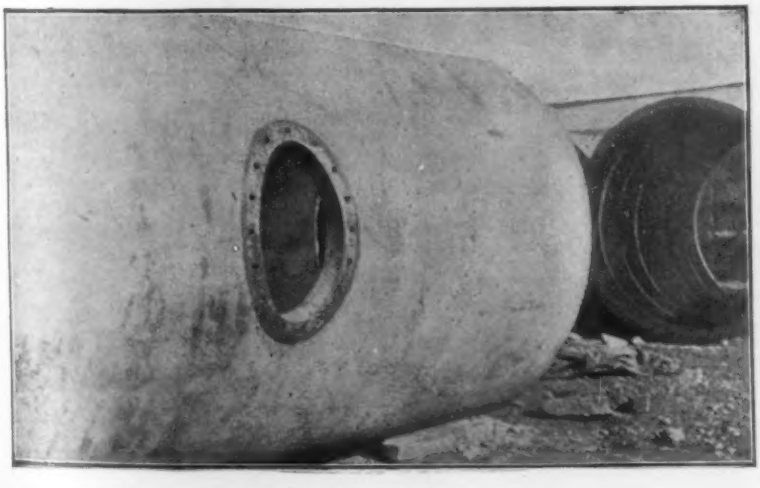
The Manufacture of Centrifugally Cast Concrete Pipe

The Hume pipe is the product of a machine for the centrifugal manufacture of concrete articles, invented by Hume Brothers of Melbourne, Australia, and now made available for use in the United States by the American Hume Concrete Pipe Company, United Savings Bank Building, Detroit, Mich.

The process of making this pipe and collars consists of first winding the wire reinforcement on a drum, the longitudinal wires and spiral wires being locked. The reinforcement, varying in weight and strength according to the pressure or external load the pipe is designed to carry, is placed in a steel mold. At the end of the mold, flanges are fixed to a depth equal to the thickness of the wall of the pipe desired. The mold is then laid horizontally in a machine consisting of friction rollers which set the mold revolving. While the mold is turning at a low speed, the amount of concrete necessary for the size of pipe required is inserted, spreading itself evenly over the inner surface and completely embedding the reinforcement. The speed is then increased. At the end of about three minutes the mold is brought to rest, and the water, which, by the action of centrifugal force, has been expelled by the concrete, is allowed to run off. The machine is then restarted and the pipe once more spun about two minutes. During this final process the inside of the pipe is burnished by passing a steel bar over the surface. The mold containing the pipe is now taken from the machine and steamed for four or five hours at a temperature of approximately 100 degrees Fahrenheit. The mold is then removed and the pipe allowed to stand in the open or in water until it is required.

The length of time required for making the pipe varies according to the diameter. Two pipes 36 inches in diameter and 8 feet long require about 10 minutes, while pipes of the same length but 4 inches in diameter are turned out at the rate of one every minute, six being made on one machine.

Pipes designed to withstand internal pressures are molded with a groove sunk in the end of the wall. When the pipes are butted, these grooves form what may be described as a diamond-shaped canopy or canal. The collars, usually 6 inches in width, overlap these butted ends, 3 inches each way. Before joining is begun in the trench in which the pipe is to be laid, a collar is fixed to one end of each pipe by ramming semi-dry cement and sand between the inside of the collar and the outside of the pipe. This rammed portion occupies just one-half the depth of the collar. The pipe is then lowered into the trench, and the groove at the end farthest from the collar is filled with a plastic material and the pipe squeezed by means of a jacking process into the collar of the last one laid. All surplus plastic oozes out and a compact mass is left in the hollow provided for it. When the surplus plastic has been removed from



LARGE-SIZE HUME PIPE WITH MANHOLE SPUN IN PIPE AT TIME OF MANUFACTURE

1—Here's how the Barber-Greene vertical boom digs. It's down almost 7 feet here. This ditcher is working for the Birmingham Electric Company.

2—Sailing along on a 17-mile pipe line job between Joliet and Aurora, Illinois. This machine was put on this long job in preference to larger—and clumsier—machines which the Western United Company had on hand.

4—In close quarters. A head on view of a Barber-Greene coming out of a narrow Chicago alley. Here's a tight corner where hand labor has always reigned supreme.

Tear this out and send for the paper "The Use of Small Trenching Machines," delivered by A. G. Ford of the Western United Gas & Electric Co., before the 21st convention of the Illinois Gas Assn.

Name.....

Address.....

City.....

State.....

5—This overload release sprocket guards the Barber-Greene from the shocks of encountering hidden obstructions. It releases and locks automatically. When the load on the buckets is removed the sprocket automatically starts them digging again.

3—A Barber-Greene cutting trench for curb and gutter forms through an outcrop of coral rock in Florida. The speed here is but 3 feet per minute. But the Barber-Greene cut through it

Here's Why They're Buying Barber-Greenes

The East Bay Water Company, Oakland, California, dug fourteen miles of 18" by 3½' ditch at a cost of 4.79 cents per lineal foot with their Barber-Greene. This figure includes all possible digging items—interest on the investment, depreciation, upkeep, operation, incidental labor and cost of moving the machine from job to job.

Most of the digging was short run stuff. That makes the low cost per lineal foot still more remarkable. And it makes it easier to see why more and more companies are buying Barber-Greenes.

A Barber-Greene is fast on its feet. This handiness goes farther than dodging in and out of tight corners. It is translated into real digging speed.

A Barber-Greene walked through 5,000 lineal feet of trench during its second day on a Texas pipe line job. That's another reason why they're buying Barber-Greenes. And there are still more.

The vertical boom digs straight down. The Barber-Greene seldom loses more than its own length in digging up to an obstruction. And the vertical boom digs service laterals flush with the main ditch.

The full length crawlers turn the Barber-Greene in its own length and permit it to trench across rough or soft ground. An overload release sprocket protects the ditcher's mechanism from the shocks of encountering hidden obstructions. It makes the Barber-Greene as careful as human hands in digging around buried pipe.

That's why they're buying Barber-Greenes. The Barber-Greene is a fast, hard-hitting, comparatively small machine. It's easy to handle. It's easy to hold to line and grade. It digs a clean ditch. And it's fast on its feet.

Yes, it's easy to see why they're buying Barber-Greenes. Filling out the coupon in the upper right hand corner will give you a more complete story. It will bring you A. G. Ford's paper, "The Use of the Small Trenching Machine," and the latest Barber-Greene collection of ditching job pictures and information.

BARBER-GREENE COMPANY—*Representatives in Fifty Cities*—515 West Park Ave., Aurora, Ill.

BARBER GREENE

Portable Belt Conveyors — Self Feeding Bucket Loaders

Coal Loaders . . . Automatic Ditch Diggers . . . Coal Feeders

HUME PIPE INSTALLED AS CULVERT WITHOUT ADDITIONAL PROTECTION

the inside and the outside of the pipe, the second half of the collar is fixed into the next pipe in the same way; that is, by ramming in more semi-dry cement and sand. This completes the joining. The whole arrangement constitutes a joint capable of taking up expansion and contraction in the pipe. The collar being roughened internally, the cement packing adheres to it rather than to the smooth exterior of the pipe. Thus, the collar and the packing form one sheath within which the pipe can slide if expansion or contraction should cause any movement. If the pipes, therefore, should contract and draw apart, the plastic in the canal, while adhering to the pipe end, would present a concave face to the water under pressure, while expansion would merely close the pipe again. The plastic cannot be expelled, diminished or shifted. If the pipe line is buried under ground where a more or less even temperature is assured and expansion and contraction are negligible, this plastic joint is almost superfluous precaution.

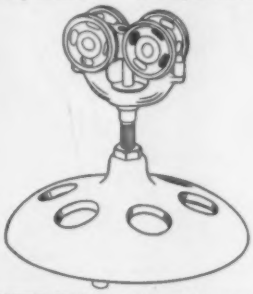
The pipe is made up from 4 inches internal diameter, suitable for telephone conduits, drainage, etc., to 8 feet in diameter, for culverts, well linings, and such purposes, and is made with an aggregate of two parts stone, two parts sand, and one part cement, modification being made to meet extra-heavy external pressure if required.

The Hume process is not confined to the manufacture of pipe alone, but may be used for manufacturing from cement any cylindrical object: for example, septic tanks of any size up to 150 persons capacity; fence posts either straight or tapered in any size and length and strength required; columns for reinforced concrete buildings in any size, strength or length up to 12 feet; porch columns either straight or tapered in any size or strength and design to meet the architecture of the building; collars of any size and length in which to set telegraph, telephone, or electric light poles to overcome deterioration from water. Steel pipe either new or used can be lined by the Hume process with concrete of any thickness desired, therefore giving additional strength and a glass-like interior surface, thus doing away with nodules and corrosion.

There are now more than 50 Hume pipe companies licensed and in successful operation throughout the world. They have made and laid millions of feet of Hume pipe from 4 inches to 8 feet in diameter for water-mains, culverts, drainage, irrigation, and other purposes.

A Special Jig for Welding Fire Hydrants

Smith's Inventions, Inc., Minneapolis, Minn., manufacturers of welding equipment, have recently furnished the Minneapolis Water Works Department with a set of four jigs similar to the one illustrated. These jigs are used in welding breaks or cracks in fire-hydrants. Fire-hydrants are rather hard to handle; various parts have different diameters and it is practically impossible to properly line up the sections with V blocks. These jigs make the job an easy one. The base is round and wide, giving a firm foundation. The roller portions may be raised or lowered by turning the threaded arm in the base. The jig differs from the usual type in that the rollers are double instead of single. They do not bind, and hence it is an easy matter to revolve the hydrant, as the break is welded.



CONVENIENT JIG FOR REPAIRING HYDRANTS

This jig is also convenient in joining pipes of different diameters, and in repairing ornamental lamp posts, as the jigs can be easily made at a small cost.

Continuous Sludge Removal at Kansas City Water Plant

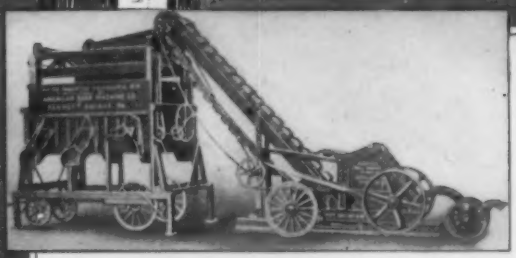
Substantial savings in operating costs are expected to be realized in the new Kansas City, Mo., water treatment plant by embodying the features of continuous sludge removal in the presedimentation units. Four 200-foot Dorr clarifiers, made by the Dorr Company, 247 Park Avenue, New York City, will be installed. These clarifiers will be designed to give the capacity flow of 100,000,000 gallons per day a detention period of three hours and to remove continuously from 80 to 90 per cent of the suspended matter from the raw Missouri River water. Although 200-foot Dorr machines are in successful operation in the mining field, the largest previous installation in water treatment plants was an 85-foot unit. The Kansas City clarifiers will be of the peripheral drive type, and the settled sludge will be returned continuously to the river. The plant was designed by Fuller & Maitland, and the James Black Masonry & Contracting Company has been awarded the contract.

Union Metal Reorganizes

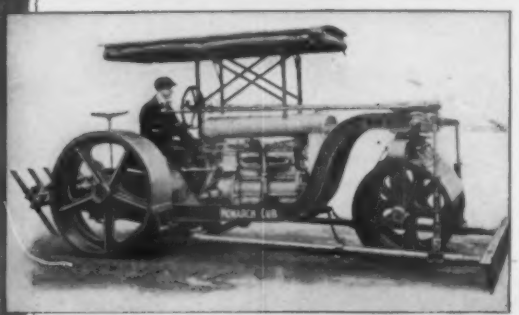
The Union Metal Manufacturing Company, Canton, Ohio, maker of street-lighting standards, has just effected a reorganization whereby a large proportion of the common stock which has been closely held by one family has been transferred to a group of men representing influential connections in utility and financial circles in the Middle West.

NO MAGIC REQUIRED IN THE BUILDING OF ROADS

Use GOOD ROADS MACHINERY



The Champion Steel Rock Crusher, mounted, with Elevator, Screen and Bin, is the ideal rock crushing plant for towns, townships, counties, cities and contractors. Large in capacity—low in upkeep cost. Built in many different sizes.



The Monarch Cub Roller is a complete road building outfit in one unit. Low in first cost, and economical in operation, the Monarch Cub Roller with scarifier and planer attachment will prove to be an economical investment wherever roads are to be built or maintained.

The Champion Heating Distributor, for mounting on motor trucks, will apply any kind of bituminous materials, light, medium, or heavy. Material can be heated quickly and applied in any quantity desired. Made in 600, 800, and 1000 gallon sizes.

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THE BUFFALO-SPRINGFIELD MAINTENANCE ROLLER

A Steam-operated Road Roller with Special Scarifier

A scarifying device which has been on the market for a number of years but which seems still to be unknown by a large group in the highway field is the scarifying attachment carried on the left roll of the Buffalo-Springfield maintenance roller, made by the Buffalo-Springfield Roller Company, Springfield, Ohio.

The Buffalo maintenance roller is built for heavy rolling and for breaking and loosening very hard and tough surfaces, such as cement, and asphaltic and bituminous concrete. It is built in sizes from 12 to 17 tons because of the constant demand for a heavier roller to properly consolidate the subgrade and surfacing material.

The scarifying device is carried on the rear axle at the left side and is a steel frame, pivoted on the axle and suspended on the axle between the drive wheel and axle bracket and at the outer axle end. The sides of this frame thus hang on each side of the left drive roll. The ends of the frame sides are connected by accurately grooved and machined heads which receive the cutting or scarifying piece. The whole frame is so arranged that the deeper the teeth penetrate the road surface, the smaller their angle of inclination to the road surface. The motion of the main scarifying frame, which carries teeth at both ends, inclined toward the bottom of the wheel, is regulated by a steam pressure cylinder riveted on a heavy steel bracket on the side of the boiler. The steam pressure can be increased or decreased in either end of the pressure cylinder and thus either end of the loosening device can be raised or lowered to any desired degree by the roller operator by simply shifting a hand lever located on the engineer's platform. Thus, only one man is required to operate the roller and scarifying device. One of the features of this mechanism is that when going forward the rear scarifying teeth are used and it is not necessary for the roller wheels to pass over the surface that has been loosened, provided the work is started at the left side of the road. In returning with the forward scarifying teeth in action, only a small portion of the scarified road-bed is covered by the extreme left-hand edge of the front roll.

When it is desired to use this Buffalo-Springfield maintenance roller solely as a road roller, the teeth can be removed and the oscillating frame held in a neutral position by a hook operated from the platform, thus requiring no steam in the pressure cylinder.

An interesting job on which one of these rollers was used recently was in breaking up an old hydraulic cement concrete base, which was immediately picked up by a revolving shovel, and thrown into the feeding bin of a portable crushing, drying, and screening plant, from which the dried and broken concrete was transported a short distance to a paving mixer, where it was used as aggregate. Thus, in a few minutes the old concrete was replaced in the street as aggregate on a new hydraulic cement base that was being laid, the roller being used to roll the subgrade after breaking up the base.

Ruggles with U. S. Cast Iron Pipe and Foundry Co.

The U. S. Cast Iron Pipe and Foundry Co., Burlington, N. J., has announced that A. V. Ruggles has severed his connection with the Cleveland, Ohio, Water Department, where he has been for the last eleven years and for part of that time as Water Commissioner, and has joined its organization as Special Representative.

A Zone Marker with Adjustable Paint Reservoir

A zone marker with several new features making it adaptable to city safety zone marking, as well as for state highway use, has been developed by the Carrara Paint Company, Cleveland, Ohio. This zone marker is well built and is simple in design and operation. It has an adjustable reservoir and is equipped with an agitator to keep the paint thoroughly mixed at all times.

MARKING TRAFFIC LANES CLEARLY AND DISTINCTLY

The flow of paint is regulated by a knob on the handle-bar. Two 4-inch brushes distribute and smooth out the paint so that the machine makes an even line at a fair rate of speed. It is claimed that one man can paint from 4,000 to 6,000 feet of line per hour with this marker.

Read How Dowflake Controls Dust by Binding Road Surfaces with Moisture

DOWFLAKE is a clean, odorless dust-layer in the form of dry flakes which you may apply to road surfaces with a simple, inexpensive spreader. You can treat many miles of road in a single day.

The flakes absorb moisture from the air, dissolve themselves into surface material and hold moisture for months.

This continuous, even supply of moisture not only provides positive dust control throughout the season but it also holds surface material moisture-bound so it cannot blow away.

Moist road surfaces pack—they do not wear away as rapidly as dry, crumbly roads. Resurfacing costs are cut in two.

You can shape a moisture-bound *Dowflake* road any time—you don't have to wait for rain.

Loose gravel loses its terrors if you apply *Dowflake*. Moistened gravel packs into a firm, resilient driving surface. There are no accidents from dust clouded vision on roads maintained with *Dowflake*.

Dowflake's moisture absorbing and retaining qualities make it ideal for pavement curing.

"The Improved Form of Calcium Chloride," which this company has developed and for some years past has marketed under the trade-name "*Dowflake*," as well as the method of manufacture of this product, are fully protected by United States Letters Patent No. 1,527,121, dates February 17, 1925.

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NEW LIGHTING POSTS IN GROSSE PARK, MICH.

Progressive Village Installs Unique Street Lighting

The progressive village of Grosse Park, Mich., has just completed the installation of new street lighting that is economical and produces efficient light for its highways. This village, located on the northwest shore of Lake St. Clair, with rapid-transit facilities to the city of Detroit, realizing the necessity of maintaining satisfactory living conditions and progressive outward appearances, decided to install a lighting system that would produce the desired results and that would have an architectural design to blend with the surroundings by day.

The lighting committee, composed of the President, Mr. George Defer, and the trustees, A. H. Scratch, A. J. Garska, and T. P. Verlinden, in consultation with W. H. Hermann of the Illuminating Bureau of the Westinghouse Companies, selected for the new installation a unit that satisfies the desired requirements and introduces some unique features.

The outstanding feature of the lighting units selected is in the design of the posts. These posts are of the boulevard type in cast iron, with the light center 14 feet above street level. Each post has in its base a small transformer which reduces the higher pressure of the distribution system to a safe operating voltage. With such an arrangement the distributing system can be operated at relatively high voltages, thus reducing transmission losses and eliminating fatalities occurring from short-circuits in the post.

A distinctive feature of these lighting units is the efficient focusing of the light on the roadway. The light emanates from an octagonal unit, the glass panels of which are separately replaceable at small cost in the case of accidental breakage. The light rays from the 6,000-lumen Mazda lamps are redirected by a Bi-lux refractor. This is a device for the efficient distribution of the light in street-lighting practice. Light that ordinarily is wasted on the upper air and illuminates the houses and lots in the vicinity more than is necessary, is redirected to the roadway plane.

This new lighting system has given Grosse Point Park a safe and satisfactory street illumination and has added to the beauty of the boulevard, indicating the progressive spirit of the community.

Asphalt Mastic Filler for Granite Block Paving

With regard to a proper joint filler, granite block and brick pavements are similar. The necessary qualities of a good filler are practically identical in both cases. Consequently, the approval of asphalt filler for brick paving by the National Paving Brick Manufacturers Associa-

GRANITE BLACK PAVEMENT ON ELBERON AVENUE, CINCINNATI, OHIO, LAID WITH TEXACO ASPHALT FILLER, WHICH ALSO FORMED A SURFACE MAT

Kyrock—the Stitch in Time Which Saves Your Old Streets

THE time to repair a pavement is when the break first occurs. Moisture beneath the surface and the multiplied impact of heavy traffic on broken areas cause rapid disintegration. A repair which could be made for a dollar today will cost many times as much if the work is delayed. Extended neglect may call for new surface or complete new construction.

Kyrock encourages prompt and efficient maintenance of pavements because it is shipped ready to lay without mixing, heating or other preparation. It may be stored in the open and used as needed.

Kyrock is most economical because of the simplicity of laying and the small equipment required for patching—shovel, rake and tamp. Kyrock patches bond and usually outwear the surrounding old surface.

Extensively used by states, counties and cities for patching and re-surfacing old gravel, macadam, telford, brick, concrete and asphalt roadways. Because of its fine sand aggregate, Kyrock is peculiarly adapted for feather edge patches on brick and concrete.

Specifications for patching and re-surfacing all standard types of pavements will be sent to engineers, road and street officials. Write for literature on Kyrock maintenance, Booklet A. C. 2.

Kentucky Rock Asphalt Co.

Incorporated

Marion E. Taylor Bldg. Louisville, Ky.

tion, in 1921, has had its influence on the field of granite block paving as well. Some of the granite block companies to-day recommend asphalt filler in their specifications, a fact due not only to their own experience, but to a preference expressed by a great many engineers who have constructed this type of paving.

The method of using asphalt as a granite block filler differs slightly from the practice in brick paving. Because of the larger spaces between the blocks, a mixture of asphalt and sand is employed in granite paving instead of the straight asphalt, as in brick paving. The sand used for an asphalt mastic block filler must be clean and fine, passing a 20-mesh sieve. After the asphalt has been heated to a temperature of about 275 to 300 degrees Fahrenheit, it is mixed with the sand, which is heated to between 300 and 400 degrees Fahrenheit. The proportion of asphalt to sand is approximately one to one.

The mastic is poured on the surface of the blocks and forced into the joints by means of a squeegee, an implement resembling a rake. The asphalt is squeegeed back and forth over the blocks until the joints are completely filled. A thin mat remains on the surface, serving to reduce the noise of traffic and acting as a temporary protection from traffic impact.

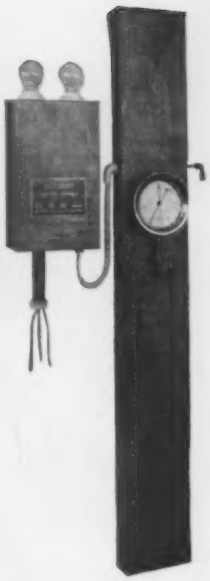
This type of filler takes up the expansion and contraction which results from temperature changes, thus eliminating possible cracking and buckling. Asphalt gives a water-tight joint, because it is inherently water-proof and is able to maintain a perfect adhesion to the block. When it becomes necessary to open the pavement to reach underground piping, the asphalt mastic filler makes it easy to remove and replace blocks. In instances where horse-drawn traffic uses the street, this type of joint furnishes a grip for the horses' hoofs.

We are indebted to the Asphalt Sales Department, the Texas Company, 17 Battery Place, New York City, for this material.

An Accurate Tank-Level Controller

The primary fault in most electric control devices for elevated tanks or reservoirs has been their inaccuracy and weather troubles. Inaccuracy results in a tank which is either not more than three-quarters full or is overflowing. The first means a large diminution in fire protection, the second, a rusty tank with attending repaint bills and in cold climates heavy icicles. These latter are a cause of danger to the tank structure itself and also cause an increased public liability.

The Johnson tank-level controller, made by E. E. Johnson, Inc., St. Paul, Minn., consists of a header with a series of loops which are filled with mercury. A contact is established between the variable rod and tube and the mercury, actuating the control switches in the adjacent control box. The installation of this controller is simple, as only a ⅛-inch pipe or copper tube is necessary to be connected with the riser to the tank and the electrical connections to the stop and start button on the motor control.



ENCLOSED TANK-LEVEL CONTROLLER

One of these controllers was installed in the village of Lamberton, Minn., in 1922, for the control of the water in a tank 110 feet high, which was supplied by a deep-well pump operated by a motor. Previous to 1922 the pump was started and stopped by an operator from the electric light plant. Because of complaints of lack of water from overflow, a float switch was installed to remedy these conditions. The float switch failed in cold weather, and the Johnson tank-level controller was put in, and has been in continuous operation since 1922. It has prevented the overflow altogether, and the tank never lacks more than a foot and a half of being full. The pumping cost for the operator is $15 per month, and the estimated saving in up-keep and operating costs is at least $300 a year, to say nothing of the satisfaction to the taxpayers due to the better water service and fire protection.

A Slant Lettering Guide

The Wrico lettering guide, made by the Wood-Regan Instrument Company, Inc., 154 Nassau Street, New York City, has been well known in the engineering field for some time. Through the use of these simple guides, accurate, uniform, vertical lettering can be handled rapidly even by inexperienced draftsmen. Now, this company has enlarged its selection of lettering guides to furnish them for slant lettering. This is in response to a demand that has arisen principally among users of the vertical guide who desire to incorporate both styles of lettering in their work.

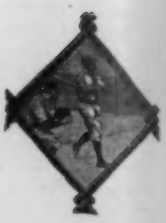
ELECTRIC DERAIL FOR BRIDGE CROSSING

CROSS SECTION THROUGH SUBSTRUCTURE

DETAILS OF STEAM LUBRICATOR PARTS

GRAPH SHOWING COST OF MAINTENANCE

FULL-SIZE SAMPLE OF ONE SIZE OF WRICO SLANT LETTERING REPRODUCED WITHOUT RETOUCHING



The Matter of Fence Enclosure

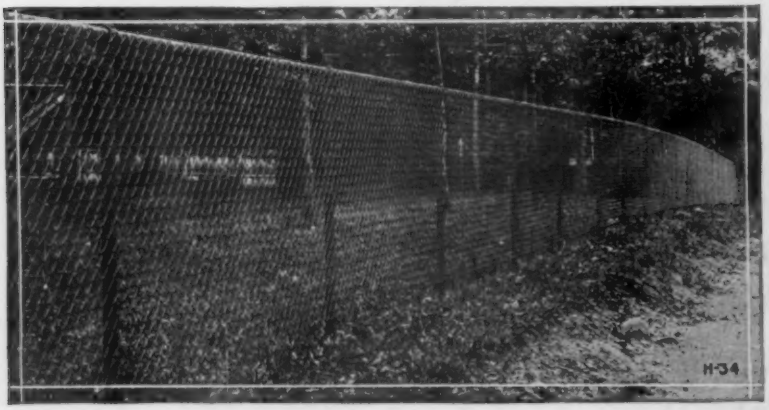
of Your Parks & Playgrouuds Is An Important One

A fence controls the recreational use of a park and makes for ordered enjoyment of its beauties. The choice of Wrought Iron or of Chain Link Wire Fencing is dictated largely by the appropriation available—and either is a satisfying park improvement.

Along with this you must consider tennis court enclosures, baseball backstops, or perhaps a completely fenced athletic field. Here, too, "Stewart-Afco" should be your chief reliance. You have a wide choice of materials, the advice of fence experts and a competent erection service.

Catalogs, or designs and cost estimates furnished.

We also make Park and Institution Entrance Gateways of ornamental iron, Reservoir Railings and Fencing for Watershed Property.



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